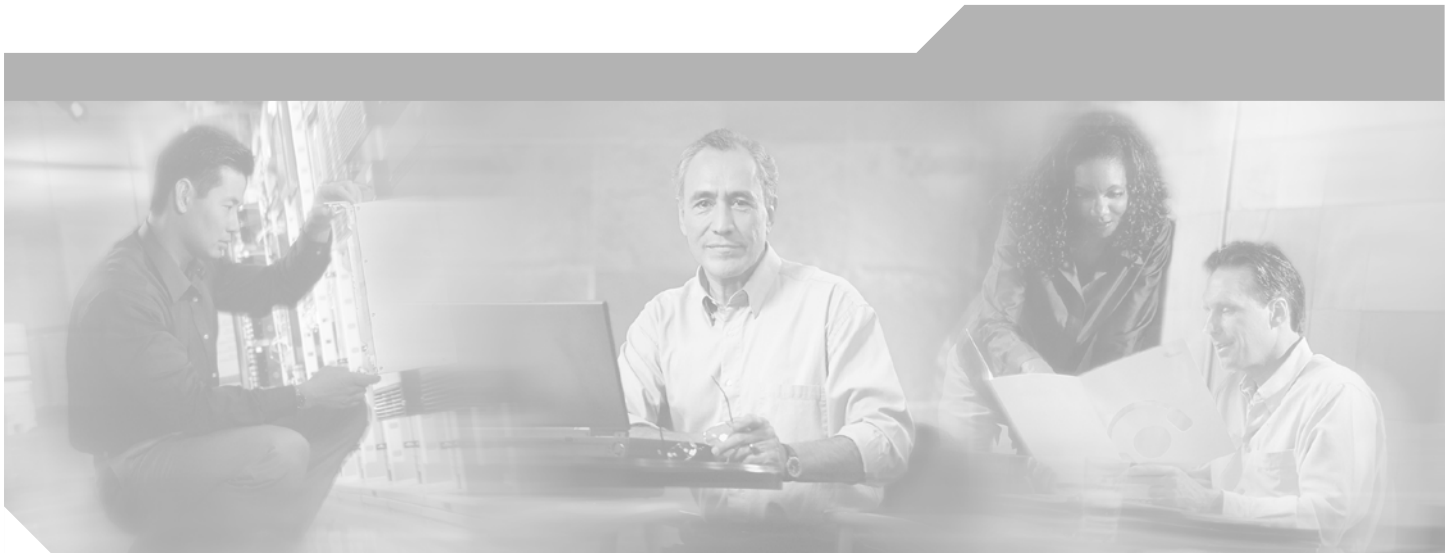

Cisco ME 2400 Ethernet Access Switch Hardware Installation Guide

November 2005

Corporate Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
http://www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

Text Part Number: OL-7678-01

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Preface

Audience

This guide is for the networking or computer technician responsible for installing the Cisco Metro Ethernet (ME) 2400 Series Ethernet Access switch, hereafter known as *the switch.* We assume that you are familiar with the concepts and terminology of Ethernet and local area networking.

Purpose

This guide describes the hardware features of the Cisco ME switch. It describes the physical and performance characteristics of the switch, explains how to install it, and provides troubleshooting information.

This guide does not describe system messages that you might receive or how to configure your switch. For more information, see the switch software configuration guide, the switch command reference, and the switch system message guide on the Cisco.com Product Documentation home page. For information about the standard Cisco IOS Release 12.1 or 12.2 commands, see the Cisco IOS documentation set from the Cisco.com home page at **Service and Support > Technical Documents**. On the Cisco Product Documentation home page, select Release **12.1** or **12.2** from the Cisco IOS Software drop-down list.

Organization

This guide is organized into these chapters:

Chapter 1, "Product Overview," is a physical and functional overview of the Cisco ME switch. It describes the switch ports, the standards that they support, and the switch LEDs.

Chapter 2, "Switch Installation," has the procedures on how to power the switch, how to install the switch in a rack, on a wall, on a table, or on a shelf, and how to make port connections.

Chapter 3, "Troubleshooting," describes how to identify and resolve some of the problems that might arise when installing the switch.

Appendix A, "Technical Specifications," lists the physical and environmental specifications for the switches and the regulatory agency approvals.

Appendix B, "Connector and Cable Specifications," describes the connectors, cables, and adapters that can be used to connect to the switch.

Appendix C, "Connecting to DC Power"describes how to connect the Cisco ME switch to a direct current (DC)-input power source.

Appendix D, "Configuring the Switch with the CLI-Based Setup Program," has an installation and setup procedure for a standalone switch.

Conventions

This document uses these conventions and symbols for notes, cautions, and warnings:

Note Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in this manual.

Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Warning **IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Waarschuwing **BELANGRIJKE VEILIGHEIDSINSTRUCTIES**

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waarschuwing die bij het apparaat wordt geleverd, wilt raadplegen.

BEWAAR DEZE INSTRUCTIES

Varoitus **TÄRKEITÄ TURVALLISUUSOHJEITA**

Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin käsittelet laitteistoa, huomioi sähköpiirien käsittelemiseen liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla.

SÄILYTÄ NÄMÄ OHJEET

Attention **IMPORTANTES INFORMATIONS DE SÉCURITÉ**

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS

Warnung **WICHTIGE SICHERHEITSHINWEISE**

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.

Avvertenza **IMPORTANTI ISTRUZIONI SULLA SICUREZZA**

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate in questo documento.

CONSERVARE QUESTE ISTRUZIONI

Advarsel **VIKTIGE SIKKERHETSINSTRUKSJONER**

Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten.

TA VARE PÅ DISSE INSTRUKSJONENE

Aviso **INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham este dispositivo.

GUARDE ESTAS INSTRUÇÕES

¡Advertencia! **INSTRUCCIONES IMPORTANTES DE SEGURIDAD**

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES

Varning! **VIKTIGA SÄKERHETSANVISNINGAR**

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som medföljer denna anordning.

SPARA DESSA ANVISNINGAR

Figyelem **FONTOS BIZTONSÁGI ELOÍRÁSOK**

Ez a figyelmezeto jel veszélyre utal. Sérülésveszélyt rejto helyzetben van. Mielott bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplo figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján keresheto meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!

Предупреждение **ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ**

Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.

СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ

警告　重要的安全性说明

此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来找到此设备的安全性警告说明的翻译文本。

请保存这些安全性说明

警告　安全上の重要な注意事項

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語版は、各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。

これらの注意事項を保管しておいてください。

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이 지시 사항을 보관하십시오.

Aviso　INSTRUÇÕES IMPORTANTES DE SEGURANÇA

Este símbolo de aviso significa perigo. Você se encontra em uma situação em que há risco de lesões corporais. Antes de trabalhar com qualquer equipamento, esteja ciente dos riscos que envolvem os circuitos elétricos e familiarize-se com as práticas padrão de prevenção de acidentes. Use o número da declaração fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham o dispositivo.

GUARDE ESTAS INSTRUÇÕES

Advarsel　VIGTIGE SIKKERHEDSANVISNINGER

Dette advarselssymbol betyder fare. Du befinder dig i en situation med risiko for legemesbeskadigelse. Før du begynder arbejde på udstyr, skal du være opmærksom på de involverede risici, der er ved elektriske kredsløb, og du skal sætte dig ind i standardprocedurer til undgåelse af ulykker. Brug erklæringsnummeret efter hver advarsel for at finde oversættelsen i de oversatte advarsler, der fulgte med denne enhed.

GEM DISSE ANVISNINGER

تحذير　إرشادات الأمان الهامة

يوضح رمز التحذير هذا وجود خطر. وهذا يعني أنك متواجد في مكان قد ينتج عنه التعرض لإصابات. قبل بدء العمل، احذر مخاطر التعرض للصدمات الكهربائية وكن على علم بالإجراءات القياسية للحيلولة دون وقوع أي حوادث. استخدم رقم البيان الموجود في أخر كل تحذير لتحديد مكان ترجمته داخل تحذيرات الأمان المترجمة التي تأتي مع الجهاز.
قم بحفظ هذه الإرشادات

Upozorenje

VAŽNE SIGURNOSNE NAPOMENE

Ovaj simbol upozorenja predstavlja opasnost. Nalazite se u situaciji koja može prouzročiti tjelesne ozljede. Prije rada s bilo kojim uređajem, morate razumjeti opasnosti vezane uz električne sklopove, te biti upoznati sa standardnim načinima izbjegavanja nesreća. U prevedenim sigurnosnim upozorenjima, priloženima uz uređaj, možete prema broju koji se nalazi uz pojedino upozorenje pronaći i njegov prijevod.

SAČUVAJTE OVE UPUTE

Upozornění

DŮLEŽITÉ BEZPEČNOSTNÍ POKYNY

Tento upozorňující symbol označuje nebezpečí. Jste v situaci, která by mohla způsobit nebezpečí úrazu. Před prací na jakémkoliv vybavení si uvědomte nebezpečí související s elektrickými obvody a seznamte se se standardními opatřeními pro předcházení úrazům. Podle čísla na konci každého upozornění vyhledejte jeho překlad v přeložených bezpečnostních upozorněních, která jsou přiložena k zařízení.

USCHOVEJTE TYTO POKYNY

Προειδοποίηση

ΣΗΜΑΝΤΙΚΕΣ ΟΔΗΓΙΕΣ ΑΣΦΑΛΕΙΑΣ

Αυτό το προειδοποιητικό σύμβολο σημαίνει κίνδυνο. Βρίσκεστε σε κατάσταση που μπορεί να προκαλέσει τραυματισμό. Πριν εργαστείτε σε οποιοδήποτε εξοπλισμό, να έχετε υπόψη σας τους κινδύνους που σχετίζονται με τα ηλεκτρικά κυκλώματα και να έχετε εξοικειωθεί με τις συνήθεις πρακτικές για την αποφυγή ατυχημάτων. Χρησιμοποιήστε τον αριθμό δήλωσης που παρέχεται στο τέλος κάθε προειδοποίησης, για να εντοπίσετε τη μετάφρασή της στις μεταφρασμένες προειδοποιήσεις ασφαλείας που συνοδεύουν τη συσκευή.

ΦΥΛΑΞΤΕ ΑΥΤΕΣ ΤΙΣ ΟΔΗΓΙΕΣ

אזהרה

הוראות בטיחות חשובות

סימן אזהרה זה מסמל סכנה. אתה נמצא במצב העלול לגרום לפציעה. לפני שתעבוד עם ציוד כלשהו, עליך להיות מודע לסכנות הכרוכות במעגלים חשמליים ולהכיר את הנהלים המקובלים למניעת תאונות. השתמש במספר ההוראה המסופק בסופה של כל אזהרה כד לאתר את התרגום באזהרות הבטיחות המתורגמות שמצורפות להתקן.

שמור הוראות אלה

Opomena

ВАЖНИ БЕЗБЕДНОСНИ НАПАТСТВИЈА

Симболот за предупредување значи опасност. Се наоѓате во ситуација што може да предизвика телесни повреди. Пред да работите со опремата, бидете свесни за ризикот што постои кај електричните кола и треба да ги познавате стандардните постапки за спречување на несреќни случаи. Искористете го бројот на изјавата што се наоѓа на крајот на секое предупредување за да го најдете неговиот период во преведените безбедносни предупредувања што се испорачани со уредот.

ЧУВАЈТЕ ГИ ОВИЕ НАПАТСТВИЈА

Ostrzeżenie **WAŻNE INSTRUKCJE DOTYCZĄCE BEZPIECZEŃSTWA**

Ten symbol ostrzeżenia oznacza niebezpieczeństwo. Zachodzi sytuacja, która może powodować obrażenia ciała. Przed przystąpieniem do prac przy urządzeniach należy zapoznać się z zagrożeniami związanymi z układami elektrycznymi oraz ze standardowymi środkami zapobiegania wypadkom. Na końcu każdego ostrzeżenia podano numer, na podstawie którego można odszukać tłumaczenie tego ostrzeżenia w dołączonym do urządzenia dokumencie z tłumaczeniami ostrzeżeń.

NINIEJSZE INSTRUKCJE NALEŻY ZACHOWAĆ

Upozornenie **DÔLEŽITÉ BEZPEČNOSTNÉ POKYNY**

Tento varovný symbol označuje nebezpečenstvo. Nachádzate sa v situácii s nebezpečenstvom úrazu. Pred prácou na akomkoľvek vybavení si uvedomte nebezpečenstvo súvisiace s elektrickými obvodmi a oboznámte sa so štandardnými opatreniami na predchádzanie úrazom. Podľa čísla na konci každého upozornenia vyhľadajte jeho preklad v preložených bezpečnostných upozorneniach, ktoré sú priložené k zariadeniu.

USCHOVAJTE SI TENTO NÁVOD

Related Publications

You can order printed copies of documents with a DOC-xxxxxx= number. For more information, see the "Obtaining Documentation" section on page xiv.

These documents provide complete information about the switch and are available from this Cisco.com site:

http://www.cisco.com/univercd/cc/td/doc/product/metro/me2400/index.htm

- *Cisco ME 3400 and Cisco ME 2400 Ethernet Access Switches Getting Started Guide* (order number DOC-7817050=)
- *Regulatory Compliance and Safety Information for the Cisco ME 3400 and Cisco ME 2400 Ethernet Access Switches* (order number DOC-78-17051=).
- *Release Notes for the Cisco ME 2400 Ethernet Access Switch* (not orderable but available on Cisco.com)

Note Before installing, configuring, or upgrading the switch, see the release notes on Cisco.com for the latest information.

- *Release Notes for the Cisco ME 2400 Ethernet Access Switch* (not orderable but available on Cisco.com)
- *Cisco ME 2400 Ethernet Access Switch Software Configuration Guide* (order number DOC-78-17059=). This guide provides a product overview and detailed descriptions and procedures of the switch software features.

- *Cisco ME 2400 Ethernet Access Switch Command Reference* (order number DOC-78-78-17061=). This reference provides detailed descriptions of the Cisco IOS commands specifically created or modified for the switch.
- *Cisco Metro Ethernet 2400 Ethernet Access Switch System Message Guide* (order number DOC-78-17063-=). This guide provides descriptions of the system messages specifically created or modified for the switch.
- *Cisco Gigabit Ethernet Transceiver Modules Compatibility Matrix* (not orderable but available on Cisco.com)
- *Cisco 100-Megabit Ethernet SFP Modules Compatibility Matrix* (not orderable but available on Cisco.com)
- *Cisco CWDM SFP Transceiver Compatibility Matrix* (not orderable but available on Cisco.com)
- *Cisco Small Form-Factor Pluggable Modules Installation Notes* (order number DOC-7815160=)
- *Cisco CWDM GBIC and CWDM SFP Installation Notes* (not orderable but available on Cisco.com)
- *Cisco Small Form-Factor Pluggable Modules Compatibility Matrix* (not orderable but available on Cisco.com)
- *Compatibility Matrix for 1000BASE-T Small Form-Factor Pluggable Modules* (not orderable but available on Cisco.com)

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation at this URL:

http://www.cisco.com/techsupport

You can access the Cisco website at this URL:

http://www.cisco.com

You can access international Cisco websites at this URL:

http://www.cisco.com/public/countries_languages.shtml

Product Documentation DVD

Cisco documentation and additional literature are available in the Product Documentation DVD package, which may have shipped with your product. The Product Documentation DVD is updated regularly and may be more current than printed documentation.

The Product Documentation DVD is a comprehensive library of technical product documentation on portable media. The DVD enables you to access multiple versions of hardware and software installation, configuration, and command guides for Cisco products and to view technical documentation in HTML. With the DVD, you have access to the same documentation that is found on the Cisco website without being connected to the Internet. Certain products also have .pdf versions of the documentation available.

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http://www.cisco.com/go/marketplace/

Ordering Documentation

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http://www.cisco.com/go/marketplace/

Nonregistered Cisco.com users can order technical documentation from 8:00 a.m. to 5:00 p.m. (0800 to 1700) PDT by calling 1 866 463-3487 in the United States and Canada, or elsewhere by calling 011 408 519-5055. You can also order documentation by e-mail at tech-doc-store-mkpl@external.cisco.com or by fax at 1 408 519-5001 in the United States and Canada, or elsewhere at 011 408 519-5001.

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You can send comments about Cisco documentation to bug-doc@cisco.com.

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Cisco Systems
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170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Cisco Product Security Overview

Cisco provides a free online Security Vulnerability Policy portal at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

From this site, you can perform these tasks:

- Report security vulnerabilities in Cisco products.
- Obtain assistance with security incidents that involve Cisco products.
- Register to receive security information from Cisco.

A current list of security advisories and notices for Cisco products is available at this URL:

http://www.cisco.com/go/psirt

If you prefer to see advisories and notices as they are updated in real time, you can access a Product Security Incident Response Team Really Simple Syndication (PSIRT RSS) feed from this URL:

http://www.cisco.com/en/US/products/products_psirt_rss_feed.html

Reporting Security Problems in Cisco Products

Cisco is committed to delivering secure products. We test our products internally before we release them, and we strive to correct all vulnerabilities quickly. If you think that you might have identified a vulnerability in a Cisco product, contact PSIRT:

- Emergencies—security-alert@cisco.com

  An emergency is either a condition in which a system is under active attack or a condition for which a severe and urgent security vulnerability should be reported. All other conditions are considered nonemergencies.

- Nonemergencies—psirt@cisco.com

In an emergency, you can also reach PSIRT by telephone:

- 1 877 228-7302
- 1 408 525-6532

Tip We encourage you to use Pretty Good Privacy (PGP) or a compatible product to encrypt any sensitive information that you send to Cisco. PSIRT can work from encrypted information that is compatible with PGP versions 2.*x* through 8.*x*.

Never use a revoked or an expired encryption key. The correct public key to use in your correspondence with PSIRT is the one linked in the Contact Summary section of the Security Vulnerability Policy page at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

The link on this page has the current PGP key ID in use.

Obtaining Technical Assistance

Cisco Technical Support provides 24-hour-a-day award-winning technical assistance. The Cisco Technical Support & Documentation website on Cisco.com features extensive online support resources. In addition, if you have a valid Cisco service contract, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not have a valid Cisco service contract, contact your reseller.

Cisco Technical Support & Documentation Website

The Cisco Technical Support & Documentation website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day, at this URL:

http://www.cisco.com/techsupport

Access to all tools on the Cisco Technical Support & Documentation website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:

http://tools.cisco.com/RPF/register/register.do

Note Use the Cisco Product Identification (CPI) tool to locate your product serial number before submitting a web or phone request for service. You can access the CPI tool from the Cisco Technical Support & Documentation website by clicking the **Tools & Resources** link under Documentation & Tools. Choose **Cisco Product Identification Tool** from the Alphabetical Index drop-down list, or click the **Cisco Product Identification Tool** link under Alerts & RMAs. The CPI tool offers three search options: by product ID or model name; by tree view; or for certain products, by copying and pasting **show** command output. Search results show an illustration of your product with the serial number label location highlighted. Locate the serial number label on your product and record the information before placing a service call.

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool provides recommended solutions. If your issue is not resolved using the recommended resources, your service request is assigned to a Cisco engineer. The TAC Service Request Tool is located at this URL:

http://www.cisco.com/techsupport/servicerequest

For S1 or S2 service requests or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)
EMEA: +32 2 704 55 55
USA: 1 800 553-2447

For a complete list of Cisco TAC contacts, go to this URL:

http://www.cisco.com/techsupport/contacts

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—Your network is “down,” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- Cisco Marketplace provides a variety of Cisco books, reference guides, documentation, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:

  http://www.cisco.com/go/marketplace/

- *Cisco Press* publishes a wide range of general networking, training and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:

  http://www.ciscopress.com

- *Packet* magazine is the Cisco Systems technical user magazine for maximizing Internet and networking investments. Each quarter, Packet delivers coverage of the latest industry trends, technology breakthroughs, and Cisco products and solutions, as well as network deployment and troubleshooting tips, configuration examples, customer case studies, certification and training information, and links to scores of in-depth online resources. You can access Packet magazine at this URL:

  http://www.cisco.com/packet

- *iQ Magazine* is the quarterly publication from Cisco Systems designed to help growing companies learn how they can use technology to increase revenue, streamline their business, and expand services. The publication identifies the challenges facing these companies and the technologies to help solve them, using real-world case studies and business strategies to help readers make sound technology investment decisions. You can access iQ Magazine at this URL:

  http://www.cisco.com/go/iqmagazine

  or view the digital edition at this URL:

  http://ciscoiq.texterity.com/ciscoiq/sample/

- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:

  http://www.cisco.com/ipj

- Networking products offered by Cisco Systems, as well as customer support services, can be obtained at this URL:

  http://www.cisco.com/en/US/products/index.html

- Networking Professionals Connection is an interactive website for networking professionals to share questions, suggestions, and information about networking products and technologies with Cisco experts and other networking professionals. Join a discussion at this URL:

  http://www.cisco.com/discuss/networking

- World-class networking training is available from Cisco. You can view current offerings at this URL:

  http://www.cisco.com/en/US/learning/index.html

Product Overview

The Cisco Metro Ethernet (ME) 2400 Ethernet Access switch—also referred to as *the switch*—is an Ethernet access switch to which you can connect other network devices such as routers, other switches, a home access gateway (HAG), or a computer. This chapter provides a functional overview of the Cisco ME switch. These topics are included:

- Setting up the Switch, page 1-1
- Features, page 1-1
- Front Panel Description, page 1-2
- Rear Panel Description, page 1-6
- Management Options, page 1-7

Setting up the Switch

See the *Cisco ME 3400 and Cisco ME 2400 Ethernet Access Switches Getting Started Guide* that shipped with the switch for instructions on how to initially configure your switch. The getting started guide also covers switch management options, basic rack-mounting procedures, port and module connections, power connection procedures, and troubleshooting help.

For instructions on setting up your switch using the command-line interface (CLI), see Appendix D, "Configuring the Switch with the CLI-Based Setup Program."

Features

The Cisco ME switch can be deployed as a backbone switch, aggregating 10BASE-T and 100BASE-TX Ethernet traffic from other network devices. The switch supports AC power and DC power. See the switch software configuration guide for examples showing how you might deploy the switch in your network. All Cisco ME switches have 24 10/100 ports and 2 small form-factor pluggable (SFP) ports.

- These are the switch models:
- Cisco ME-2400-24TS-AC
- Cisco ME-2400-24TS-DC
- The switch supports these SFP modules; also see the "SFP Modules" section on page 1-4.
  - 100BASE-BX
  - 100BASE-FX

  - 100BASE-LX
  - 1000BASE-BX
  - 1000BASE-LX/LH
  - 1000BASE-SX
  - 1000BASE-T
  - 1000BASE-ZX
  - Coarse wavelength-division multiplexing (CWDM)

Note When installed in Cisco ME switches, 1000BASE-T SFP modules can operate at 10, 100, or 1000 Mbps in full-duplex mode or at 10 or 100 Mbps in half-duplex mode.

Note By default, the SFP module ports on the Cisco ME switch are configured as network node interfaces (NNIs). A port can be reconfigured from user network interface (UNI) to NNI and the reverse, but only four ports on the switch can be NNIs at the same time. For more information on configuring interfaces, see the software configuration guide.

- These switches support the SFP module patch cable. (Order the SFP module patch cable separately, part number CAB-SFP-50CM=.)
- Configuration
  - For 10/100 ports, the speed and duplex settings are autonegotiated.
  - For 1000BASE-T SFP module ports, the speed and duplex settings are autonegotiated.

Front Panel Description

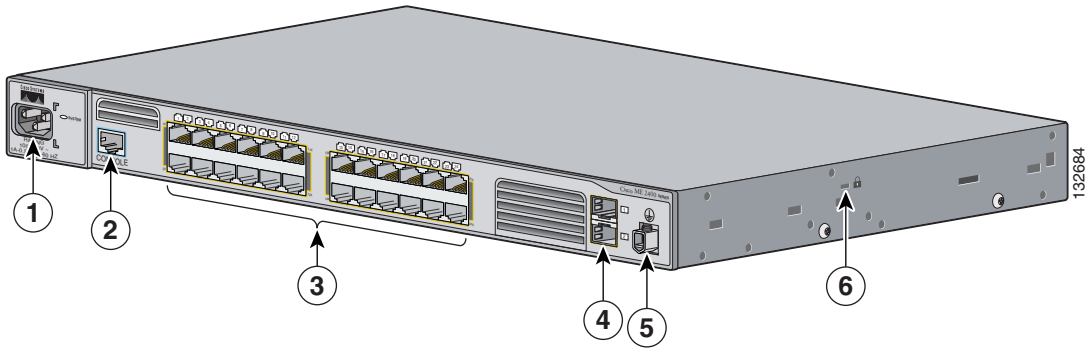
The Cisco ME switch front panel descriptions include these sections:

- Front Panel Descriptions, page 1-3
- 10/100 Ports, page 1-3
- SFP Module Slots, page 1-4
- LEDs, page 1-5
- Power Connectors, page 1-7
- Console Port, page 1-7

Front Panel Descriptions

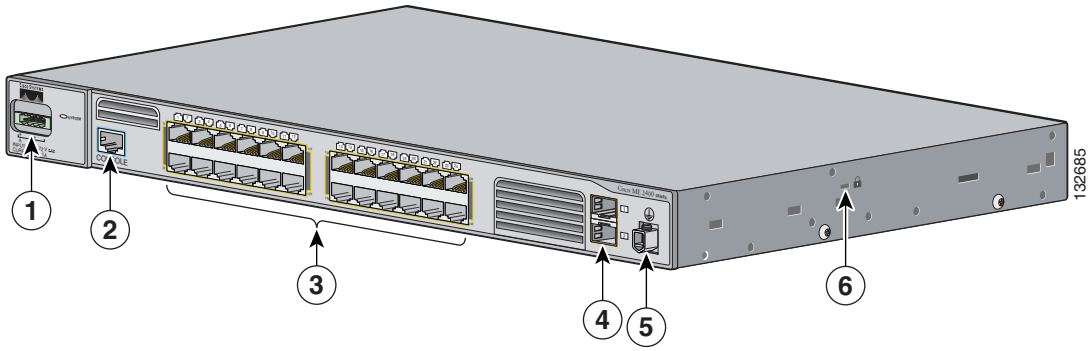
The 10/100 Fast Ethernet ports on the switch are grouped in pairs. The first member of the pair (port 1) is above the second member (port 2) on the left. Port 3 is above port 4, and so on, as shown in Figure 1-1 (the Cisco ME AC switch) and Figure 1-2 (the Cisco ME DC switch). The SFP module slots are numbered 1 and 2.

Figure 1-1 Cisco ME 2400 AC Ethernet Access Switch Front Panel



1	AC power connector	**3**	10/100 Fast Ethernet ports	**5**	Ground connector
2	Console port	**4**	Gigabit Ethernet SFP module ports	**6**	Cable lock

Figure 1-2 Cisco ME 2400 DC Ethernet Access Switch Front Panel



1	DC power connector	**3**	10/100 Fast Ethernet ports	**5**	Ground connector
2	Console port	**4**	Gigabit Ethernet SFP module ports	**6**	Cable lock

10/100 Ports

You can set the 10/100 ports on the switch to operate in any combination of half duplex, full duplex, 10 Mbps, or 100 Mbps. You can set the ports for speed and duplex autonegotiation, in compliance with IEEE 802.3ab. (The default setting is autonegotiate.)

When set for autonegotiation, the port senses the speed and duplex settings of the attached device and advertises its own capabilities. If the connected device also supports autonegotiation, the switch port negotiates the best connection (the fastest line speed that both devices support and full-duplex transmission if the attached device supports it) and configures itself accordingly. In all cases, the attached device must be within 328 feet (100 meters).

UNIs and NNIs are supported on the Cisco ME switch. UNIs are typically connected to a host, such as a PC or a Cisco IP Phone. By default, the 10/100 ports on the Cisco ME switch are configured as UNIs.

A port can be reconfigured from UNI to NNI and the reverse. When a port is reconfigured as another interface type, it inherits all the characteristics of that interface type. All ports on the Cisco ME switch are either UNI or NNI at any time.

For information on configuring interfaces, see the software configuration guide.

SFP Module Slots

The SFP module slots support the SFP modules that are supported on the Cisco ME switch. These are listed in the "SFP Modules" section on page 1-4.

By default, the SFP module ports on the Cisco ME switch are configured as NNIs. A port can be reconfigured from UNI to NNI and the reverse, but only four ports on the switch can be NNIs at the same time.

For more information on configuring interfaces, see the software configuration guide.

SFP Modules

The Cisco ME switch uses Gigabit Ethernet SFP modules to establish fiber-optic and 1000BASE-T connections. These transceiver modules are field-replaceable, providing the uplink interfaces when inserted in an SFP module slot. You can use the SFP modules for Gigabit uplink connections to other switches. You use fiber-optic cables with LC or MT-RJ connectors to connect to a fiber-optic SFP module. You use Category 5 cable with RJ-45 connectors to connect to a copper SFP module.

The Cisco ME switch supports these Cisco SFP modules:

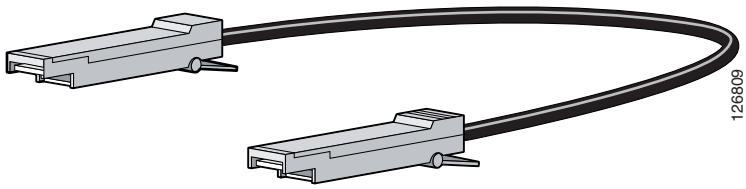
- 100BASE-BX
- 100BASE-FX
- 100BASE-LX
- 1000BASE-BX
- 1000BASE-LX/LH
- 1000BASE-SX
- 1000BASE-T
- 1000BASE-ZX
- CWDM

For more information about these SFP modules, see your SFP module documentation.

SFP Module Patch Cable

The Cisco ME switch supports the SFP module patch cable, a 1/2 meter, copper, passive cable with SFP module connectors at each end (see Figure 1-3). The patch cable can connect two Cisco ME switches in a cascaded configuration.

Figure 1-3 SFP Module Patch Cable



See "Inserting and Removing the SFP Module Patch Cable" section on page 2-21 for more information about using the SFP module patch cable.

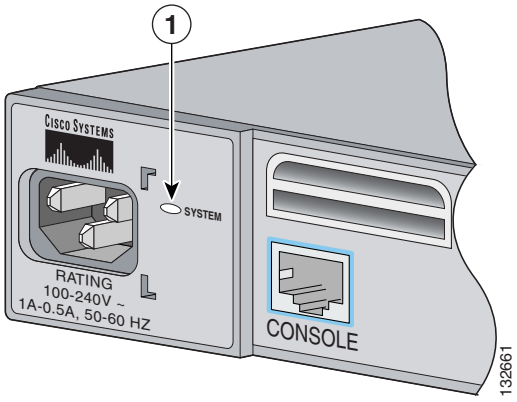
LEDs

You can use the switch System and port LEDs to monitor switch activity and performance.

System LED

Figure 1-4 shows the switch System LED.

Figure 1-4 Cisco ME Switch System LED



1	System LED

The System LED shows whether the system is receiving power and is functioning properly. Table 1-1 lists the LED colors and their meanings.

Table 1-1 System LED

Color	System Status
Off	System is not powered on.
Blinking green	POST is in progress.
Green	System is operating normally.
Amber	System is receiving power but is not functioning properly.

Port LEDs

Each RJ-45 port and SFP module slot has a port LED. These port LEDs, as a group or individually, display information about the switch and about the individual ports. Table 1-2 explains how to interpret the port LED colors.

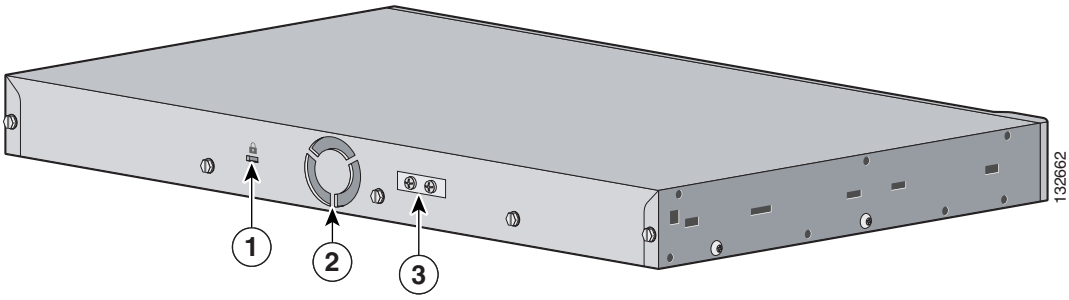
Table 1-2 Meaning of Port LED Colors

LED Color	Meaning
Off	No link, or port was administratively shut down.
Green	Link present but not sending or receiving data.
Blinking green	Activity. Port is sending or receiving data.
Alternating green-amber	Link fault. Error frames can affect connectivity, and errors such as excessive collisions, CRC errors, and alignment and jabber errors are monitored for a link-fault indication.
Amber	Port is disabled.

Rear Panel Description

The Cisco ME switch rear panel has a cable lock and an exhaust fan. (See Figure 1-5.)

Figure 1-5 Cisco ME Switch Rear Panel



1	Cable lock	3	Ground connector
2	Fan exhaust		

Power Connectors

These sections describe the power supply features for the Cisco ME AC and DC switches.

Cisco ME AC Switch Power Supply

The Cisco ME AC switch is powered through an internal power supply. The AC power supply is an autoranging unit that supports input voltages between 100 and 240 VAC. Use the supplied AC power cord to connect the AC power connector to an AC power outlet.

Cisco ME DC Switch Power Supply

The Cisco ME DC switch power supply supports input voltages between –36 to –72 VDC, 1 to 2 A. See Appendix C, "Connecting to DC Power," for instructions to connect the Cisco ME DC switch.

To order spare or replacement DC connectors, use one of these sources:

- Digi-Key, part number 277-1013-ND, www.digikey.com
- Phoenix Contact, part number 1757035, www.phoenixcontact.com

Console Port

You can connect the switch to a PC by means of the console port and an RJ-45-to-DB-9 female cable. If you want to connect the switch console port to a terminal, you need to provide an RJ-45-to-DB-25 female DTE adapter. You can order a kit (part number ACS-DSBUASYN=) containing that adapter from Cisco. For console port and adapter pinout information, see the "Connector and Cable Specifications" section on page B-1.

Management Options

These management options are available for the Cisco ME switch:

- Cisco IOS CLI

  The switch CLI is based on Cisco IOS software and is enhanced to support desktop-switching features. You can fully configure and monitor the switch from the CLI. You can access the CLI either by connecting your management station directly to the switch console port or by using Telnet from a remote management station. See the switch command reference on Cisco.com for more information.

  For setup instructions that use the CLI, go to Appendix D, "Configuring the Switch with the CLI-Based Setup Program."

- CiscoView application

  The CiscoView device-management application displays the switch image that you can use to set configuration parameters and to view switch status and performance information. The CiscoView application, which you purchase separately, can be a standalone application or part of a Simple Network Management Protocol (SNMP) platform. See the CiscoView documentation for more information.

- SNMP network management

  You can manage switches from a SNMP-compatible management station that is running platforms such as HP OpenView or SunNet Manager. The switch supports a comprehensive set of Management Information Base (MIB) extensions and four Remote Monitoring (RMON) groups. See the switch software configuration guide on Cisco.com and the documentation that came with your SNMP application for more information.

Network Configurations

See the switch software configuration guide on Cisco.com for an explanation of network configuration concepts. The software configuration guide also provides examples of network configurations that use the switch to create dedicated network segments that are interconnected through Ethernet connections.

Switch Installation

This chapter describes how to start your Cisco Metro Ethernet (ME) switch and how to interpret the power-on self-test (POST) that ensures proper operation. It also describes how to install the switch and how to make connections to the switch. Read the topics and perform the procedures in this order:

- Preparing for Installation, page 2-1
- Verifying Switch Operation, page 2-7
- Installing the Switch, page 2-7
- Installing and Removing SFP Modules, page 2-18
- Inserting and Removing the SFP Module Patch Cable, page 2-21
- Connecting to the 10/100 Ports, page 2-22
- Connecting to SFP Modules, page 2-23
- Where to Go Next, page 2-25

Preparing for Installation

This section covers these topics:

- Warnings, page 2-1
- Installation Guidelines, page 2-4
- Verifying Package Contents, page 2-6
- Verifying Switch Operation, page 2-7

Warnings

These warnings are translated into several languages in the *Regulatory Compliance and Safety Information for the Cisco ME 3400 and Cisco ME 2400 Ethernet Access Switches* document that ships with the switch.

Warning **Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals.** Statement 43

Warning **Do not stack the chassis on any other equipment. If the chassis falls, it can cause severe bodily injury and equipment damage.** Statement 48

Warning **Ethernet cables must be shielded when used in a central office environment.** Statement 171

Warning **To comply with safety regulations, mount switches on a wall with the front panel facing up.** Statement 266

Warning **Do not work on the system or connect or disconnect cables during periods of lightning activity.** Statement 1001

Warning **Before performing any of the following procedures, ensure that power is removed from the DC circuit.** Statement 1003

Warning **Read the installation instructions before connecting the system to the power source.** Statement 1004

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than:**
5 A Statement 1005

Warning **To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:**

- **This unit should be mounted at the bottom of the rack if it is the only unit in the rack.**
- **When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.**
- **If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.** Statement 1006

Warning **Class 1 laser product.** Statement 1008

Warning **This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security.** Statement 1017

Warning **The plug-socket combination must be accessible at all times, because it serves as the main disconnecting device.** Statement 1019

Warning **A readily accessible two-poled disconnect device must be incorporated in the fixed wiring.** Statement 1022

Warning **This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.** Statement 1024

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.** Statement 1030

Warning **Ultimate disposal of this product should be handled according to all national laws and regulations.** Statement 1040

Warning **For connections outside the building where the equipment is installed, the following ports must be connected through an approved network termination unit with integral circuit protection.**
10/100/1000 Ethernet Statement 1044

Warning **This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.** Statement 1045

Warning **To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of:**
122°F (50°C) Statement 1047

Warning **When installing or replacing the unit, the ground connection must always be made first and disconnected last.** Statement 1046

Warning **No user-serviceable parts inside. Do not open.** Statement 1073

Warning **Installation of the equipment must comply with local and national electrical codes.** Statement 1074

Caution To comply with the Telcordia GR-1089 Network Equipment Building Systems (NEBS) standard for electromagnetic compatibility and safety, connect the ethernet cables only to intrabuilding or nonexposed wiring or cabling.

Note The grounding architecture of this product is DC-isolated (DC-I).

Note You can use the grounding lug to attach a wrist strap for ESD protection during servicing.

Installation Guidelines

When you determine where to place the switch, be sure to observe these requirements:

- For copper Ethernet ports, including 10/100 ports and 1000BASE-T SFP module ports, cable lengths from the switch to connected devices can be up to 328 feet (100 meters).
- Table 2-1 lists the cable specifications for the fiber-optic SFP module connections. Each port must match the wave-length specifications on the other end of the cable, and for reliable communications, the cable must not exceed the required cable length.

Table 2-1 Fiber-Optic SFP Module Port Cabling Specifications

SFP Module	Wavelength (nanometers)	Fiber Type	Core Size (micron)	Modal Bandwidth (MHz/km)	Cable Distance
100BASE-BX (GLC-FE-100BX-D GLC-FE-100BX-U)	1310 TX 1550 RX	SMF	9		32,810 feet (10 km)
100BASE-FX (GLC-GE-100FX)	1310	MMF	50 62.5	500	6,562 feet (2 km)
100BASE-FX (GLC-FE-100FX)	Min: 1270 Typical: 1300 Max: 1380	MMF	50/125 62.5/125	500	6,562 feet (2 km)
100BASE-LX (100BASE-LX10)	1310	SMF	9		32,810 feet (10 km)
1000BASE-BX10-D (GLC-BX-D)	1490 TX 1310 RX	SMF	G.652[1]	—	32,810 feet (10 km)
1000BASE-BX10-U (GLC-BX-U)	1310 TX 1490 RX	SMF	G.652[1]	—	32,810 feet (10 km)

Table 2-1 Fiber-Optic SFP Module Port Cabling Specifications (continued)

SFP Module	Wavelength (nanometers)	Fiber Type	Core Size (micron)	Modal Bandwidth (MHz/km)	Cable Distance
1000BASE-SX (GLC-SX-MM)	850	MMF	62.5 62.5 50 50	160 200 400 500	722 feet (220 m) 902 feet (275 m) 1640 feet (500 m) 1804 feet (550 m)
1000BASE-LX/LH	1300	MMF[2] SMF	62.5 50 50 9/125	500 400 500 —	1804 feet (550 m) 1804 feet (550 m) 1804 feet (550 m) 32,810 feet (10 km)
1000BASE-ZX (GLC-ZX-SM	1550	SMF	9/125	—	43.4 to 62 miles (70 to 100 km)[3]
CWDM	1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610	SMF	G.652[1]	—	62 miles (100 km)

1. A mode-field diameter/cladding diameter = 9 micrometers/125 micrometers
2. A mode-conditioning patch cord is required. Using an ordinary patch cord with MMF, 1000BASE-LX/LH SFP modules, and a short link distance can cause transceiver saturation, resulting in an elevated bit error rate (BER). When using the LX/LH SFP module with 62.5-micron diameter MMF, you must also install a mode-conditioning patch cord between the SFP module and the MMF cable on both the sending and receiving ends of the link. The mode-conditioning patch cord is required for link distances greater than 984 feet (300 m).
3. 1000BASE-ZX SFP modules can send data up to 62 miles (100 km) by using dispersion-shifted SMF or low-attenuation SMF; the distance depends on the fiber quality, the number of splices, and the connectors.

Note When using shorter distances of single-mode fiber-optic cable, you might need to insert an inline optical attenuator in the link to avoid overloading the receiver.

When the fiber-optic cable span is less than 15.43 miles (25 km), you should insert a 5-decibel (dB) or 10-dB inline optical attenuator between the fiber-optic cable plant and the receiving port on the 1000BASE-ZX SFP module at each end of the link.

- Operating environment is within the ranges listed in Appendix A, “Technical Specifications.”
- Clearance to front and rear panels is such that
  - Front-panel indicators can be easily read.
  - Access to ports is sufficient for unrestricted cabling.
  - Rear-panel power connector is within reach of an AC power receptacle.
- Cabling is away from sources of electrical noise, such as radios, power lines, and fluorescent lighting fixtures. Make sure that the cabling is safely away from other devices that might damage the cables.

- Airflow around the switch and through the vents is unrestricted.
- Temperature around the unit does not exceed 113°F (50°C).

Note If the switch is installed in a closed or multirack assembly, the temperature around it might be greater than normal room temperature.

Verifying Package Contents

Note Carefully remove the contents from the shipping container, and check each item for damage. If any item is missing or damaged, contact your Cisco representative or reseller for support. Return all packing material to the shipping container, and save it.

The switch is shipped with these items:

- *Cisco ME 3400 and Cisco ME 2400 Ethernet Access Switches Getting Started Guide*
- *Regulatory Compliance and Safety Information for the Cisco ME 3400 and Cisco ME 2400 Ethernet Access Switches*
- Product registration card
- AC power cord (ships with AC-powered switches only)
- AC power cord bail (ships with AC-powered switches only)
- DC terminal block (ships with DC-powered switches only)
- Mounting kit containing:
  - Two 19-inch rack-mounting brackets (also used for wall-mounting)
  - Six Phillips flat-head screws for attaching the brackets to the switch
  - Four Phillips machine screws for attaching the brackets to a rack
  - One cable guide and one black Phillips machine screw for attaching the cable guide to one of the mounting brackets
  - Four Phillips truss-head screws (for wall-mounting brackets)

Optional items include:

- Console cable
- ESTI rack-mounting brackets (RCKMNT-ETSI-1RU)
- 23-inch rack-mounting brackets (RCKMNT-23IN-1RU)

Verifying Switch Operation

Before installing the switch in a rack, on a wall, or on a table or shelf, you should power the switch and verify that the switch passes POST.

To power on the switch, connect one end of the AC power cord to the AC power connector on the switch, and connect the other end of the power cord to an AC power outlet.

To power on a DC switch, see Appendix C, "Connecting to DC Power."

When the switch powers on, it automatically begins the POST, a series of tests that verifies that the switch functions properly. When the switch begins POST, the system LED slowly blinks green. When POST completes, the system LED blinks amber. If POST fails, the system LED remains amber. If POST completes successfully, the system LED rapidly blinks green.

Note POST failures are usually fatal. Call Cisco Systems if your switch does not pass POST.

Powering Off the Switch

After a successful POST, disconnect the power cord from the switch. Install the switch in a rack, on a wall, on a table, or on a shelf as described in the "Installing the Switch" section on page 2-7.

Installing the Switch

This section describes these installation procedures:

- Rack-Mounting, page 2-7
- Wall-Mounting, page 2-16
- Table- or Shelf- Mounting, page 2-18

Rack-Mounting

To install the switch in a 19-inch, 23-inch, 24-inch rack, or a European Telecommunications Standards Institute (ETSI) rack (24-inch racks and ETSI racks require optional mounting hardware), follow the instructions described in these procedures:

- Removing Screws from the Switch, page 2-8
- Attaching Brackets to the Switch, page 2-9
- Mounting the Switch in a Rack, page 2-15
- Attaching the Cable Guide, page 2-16

Warning **To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:**

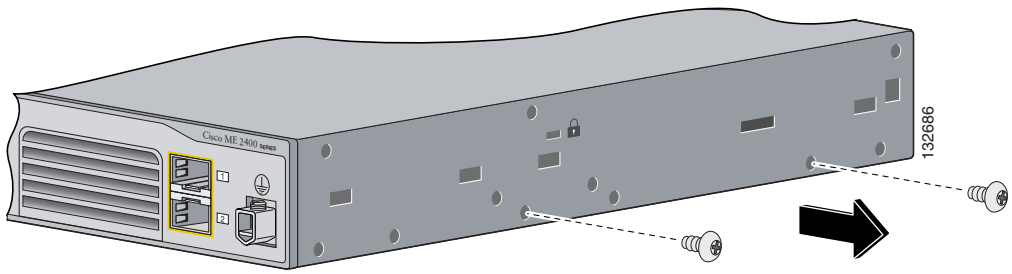
- **This unit should be mounted at the bottom of the rack if it is the only unit in the rack.**
- **When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.**
- **If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.** Statement 1006

Note Installing the switch in a 24-inch rack requires an optional bracket kit that is not included with the switch. You can order a kit containing the 24-inch rack-mounting brackets and hardware from Cisco. The kit part number is RCKMNT-1RU= (700-12398-XX).

Removing Screws from the Switch

If you plan to install the switch in a rack, you must first remove screws in the switch chassis so that mounting brackets can be attached. Figure 2-1 shows how to remove the chassis screws in a Cisco ME switch.

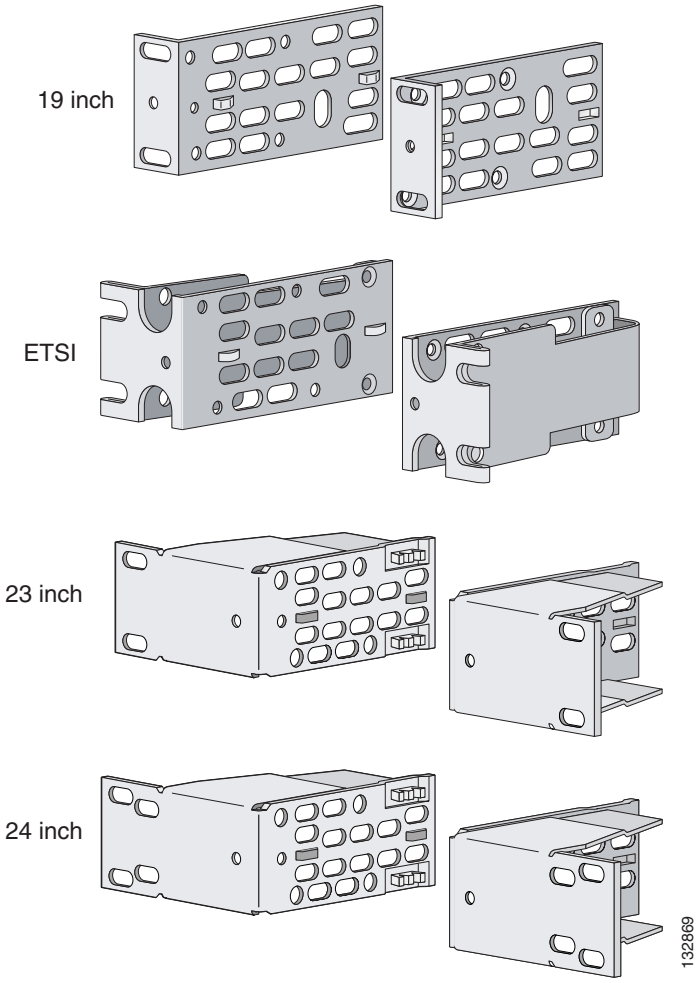
Figure 2-1 Removing Screws from the Cisco ME Switch



Attaching Brackets to the Switch

The bracket orientation and the brackets that you use depend on whether you are attaching the brackets for a 19-inch, 23-inch, 24-inch, or an ETSI rack. Figure 2-2 shows the four types of mounting brackets.

Figure 2-2 Rack-Mounting Brackets



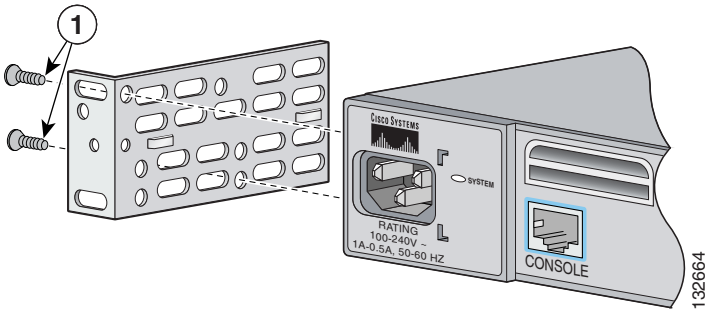
- For 19-inch racks, use part number RCKMNT-19IN-1RU (700-08209-XX), and see Attaching Brackets to 19-Inch Racks, page 2-10.
- For 23-inch racks, use part number RCKMNT-23IN-1RU= (700-21646-XX), and see Attaching Brackets for 23-Inch Racks, page 2-11.
- For 24-inch racks, use part number RCKMNT-24IN-1RU (700-13248-XX), and see Attaching Brackets to 24-Inch Racks, page 2-12.
- For ETSI racks, use part number RCKMNT-ETSI-1RU= (700-19781-XX), and see Attaching Brackets for ETSI Racks, page 2-14.

Attaching Brackets to 19-Inch Racks

These figures show how to attach brackets to 19-inch racks:

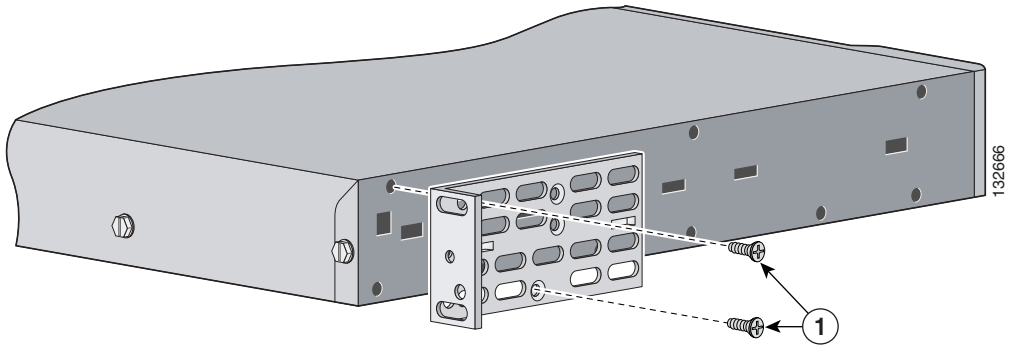
- Attaching Brackets for 19-Inch Racks to a Cisco ME Switch, Front Panel Forward, Figure 2-3 on page 2-10
- Attaching Brackets for 19-Inch Racks to a Cisco ME Switch, Rear Panel Forward, Figure 2-4 on page 2-10
- Attaching Brackets for 19-Inch Telco Racks to a Cisco ME Switch, Figure 2-5 on page 2-11

Figure 2-3 Attaching Brackets for 19-Inch Racks to a Cisco ME Switch, Front Panel Forward



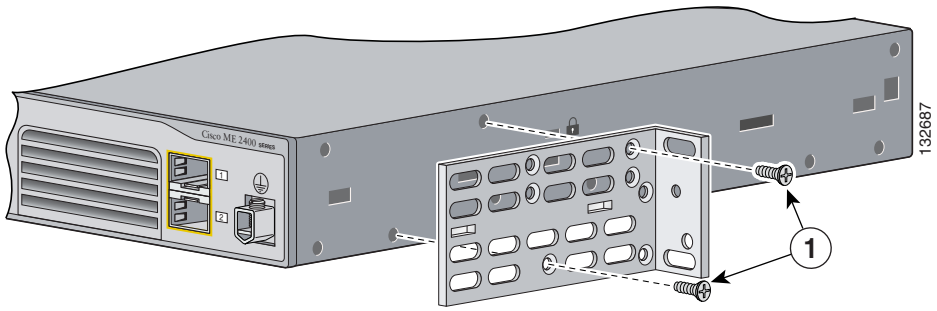
1	Phillips flat-head screws

Figure 2-4 Attaching Brackets for 19-Inch Racks to a Cisco ME Switch, Rear Panel Forward



1	Phillips flat-head screws

Figure 2-5 Attaching Brackets for 19-Inch Telco Racks to a Cisco ME Switch



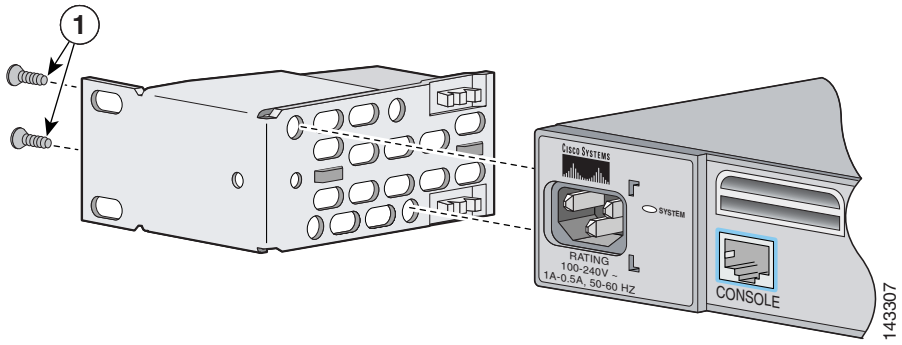
1	Phillips flat-head screws

Attaching Brackets for 23-Inch Racks

These figures show how to attach brackets to 23-inch racks:

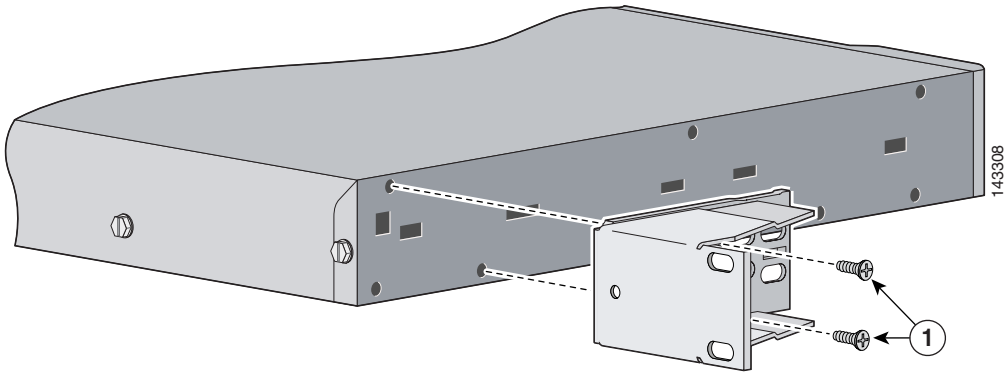
- Attaching Brackets for 23-Inch Racks to a Cisco ME Switch, Front Panel Forward, Figure 2-6 on page 2-11
- Attaching Brackets for 23-Inch Racks to a Cisco ME Switch, Rear Panel Forward, Figure 2-7 on page 2-12
- Attaching Brackets for 23-Inch Telco Racks to a Cisco ME Switch, Figure 2-8 on page 2-12

Figure 2-6 Attaching Brackets for 23-Inch Racks to a Cisco ME Switch, Front Panel Forward



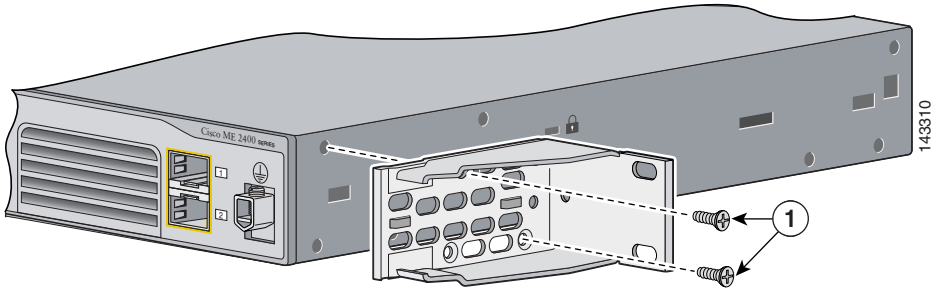
1	Phillips flat-head screws

Figure 2-7 Attaching Brackets for 23-Inch Racks to a Cisco ME Switch, Rear Panel Forward



1	Phillips flat-head screws

Figure 2-8 Attaching Brackets for 23-Inch Telco Racks to a Cisco ME Switch



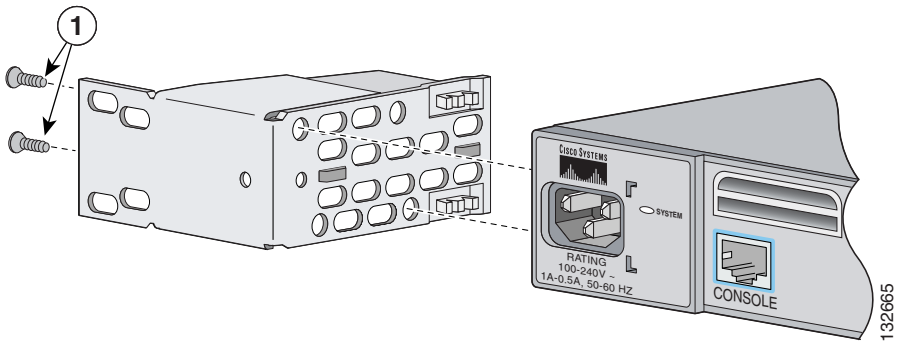
1	Phillips flat-head screws

Attaching Brackets to 24-Inch Racks

These figures show attaching brackets to 24-inch racks:

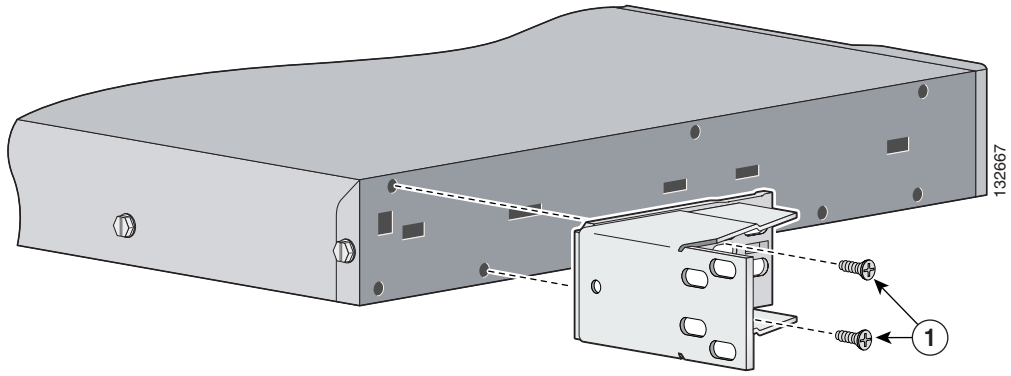
- Attaching Brackets for 24-Inch Racks to a Cisco ME Switch, Front Panel Forward, Figure 2-9 on page 2-13
- Attaching Brackets for 24-Inch Racks to a Cisco ME Switch, Rear Panel Forward, Figure 2-10 on page 2-13
- Attaching Brackets for 24-Inch Telco Racks to a Cisco ME Switch, Figure 2-11 on page 2-13

Figure 2-9 Attaching Brackets for 24-Inch Racks to a Cisco ME Switch, Front Panel Forward



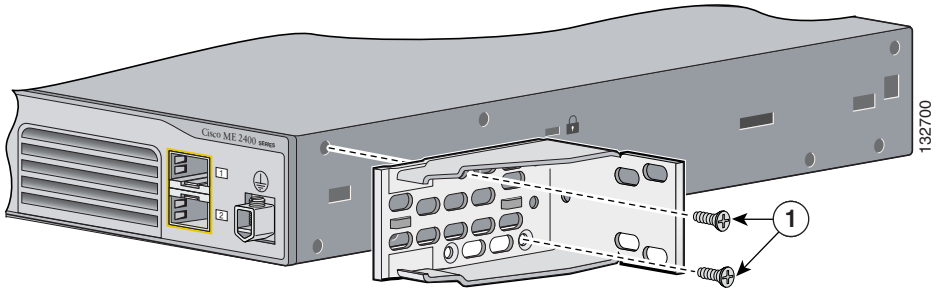
1	Phillips flat-head screws

Figure 2-10 Attaching Brackets for 24-Inch Racks to a Cisco ME Switch, Rear Panel Forward



1	Phillips flat-head screws

Figure 2-11 Attaching Brackets for 24-Inch Telco Racks to a Cisco ME Switch



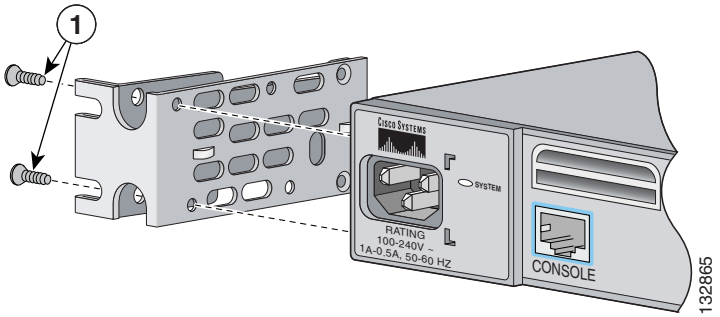
1	Phillips flat-head screws

Attaching Brackets for ETSI Racks

These figures show attaching brackets to ETSI racks:

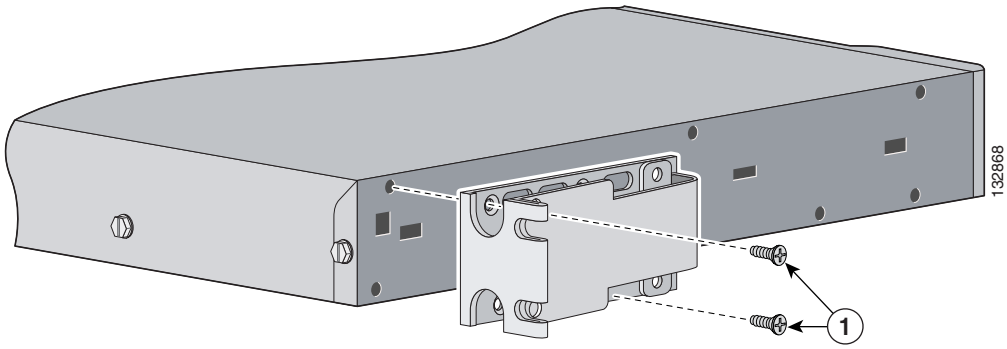
- Attaching Brackets for ETSI Racks to a Cisco ME Switch, Front Panel Forward, Figure 2-12 on page 2-14
- Attaching Brackets for ETSI Racks to a Cisco ME Switch, Rear Panel Forward, Figure 2-13 on page 2-14
- Attaching Brackets for ETSI Telco Racks to a Cisco ME Switch, Figure 2-14 on page 2-15

Figure 2-12 Attaching Brackets for ETSI Racks to a Cisco ME Switch, Front Panel Forward



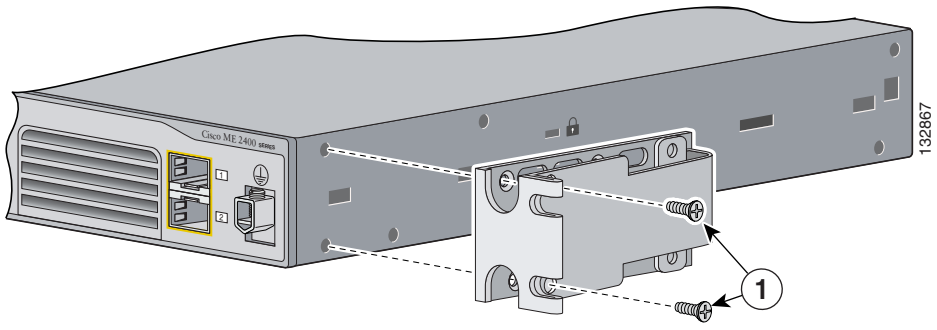
1	Phillips flat-head screws

Figure 2-13 Attaching Brackets for ETSI Racks to a Cisco ME Switch, Rear Panel Forward



1	Phillips flat-head screws

Figure 2-14 Attaching Brackets for ETSI Telco Racks to a Cisco ME Switch

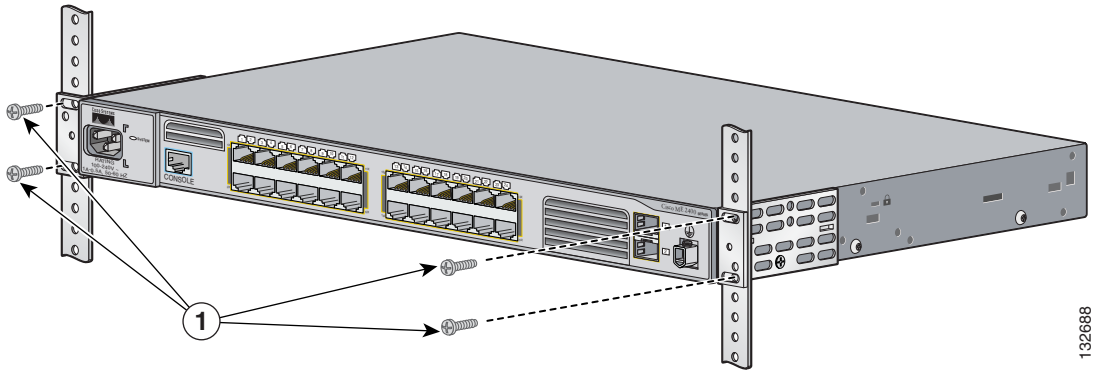


1	Phillips flat-head screws

Mounting the Switch in a Rack

After the brackets are attached to the switch, use the four supplied number-12 Phillips machine screws to securely attach the brackets to the rack, as shown in Figure 2-15.

Figure 2-15 Mounting the Cisco ME Switch in a Rack



1	Phillips machine screws

After the switch is mounted in the rack, you need to do these tasks to complete the installation:

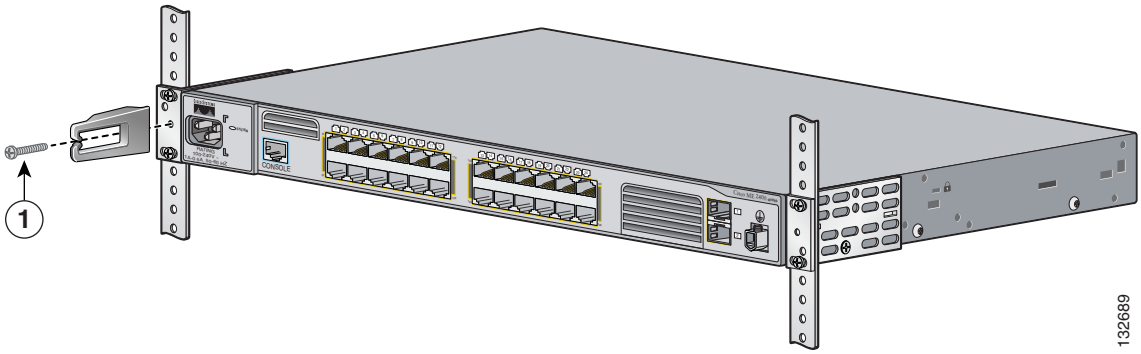
- Power on the switch. See the "Verifying Switch Operation" section on page 2-7.
- Connect to a 10/100 port and either run the Initial Configuration Dialog or use the CLI to set up your switch. See the *Cisco ME 3400 and ME 2400 Ethernet Access Switches Getting Started Guide* for instructions.
- Connect to the front-panel ports. See the "Connecting to the 10/100 Ports" section on page 2-22 and the "Connecting to SFP Modules" section on page 2-23 to complete the installation.

For configuration instructions about using the CLI setup program, go to Appendix D, "Configuring the Switch with the CLI-Based Setup Program."

Attaching the Cable Guide

We recommend attaching the cable guide to prevent the cables from obscuring the front panel of the switch and the other devices installed in the rack. Use the supplied black screw shown in Figure 2-16 to attach the cable guide to the left or right bracket.

Figure 2-16 Attaching the Cable Guide on the Cisco ME Switch



1	Cable guide screw

Wall-Mounting

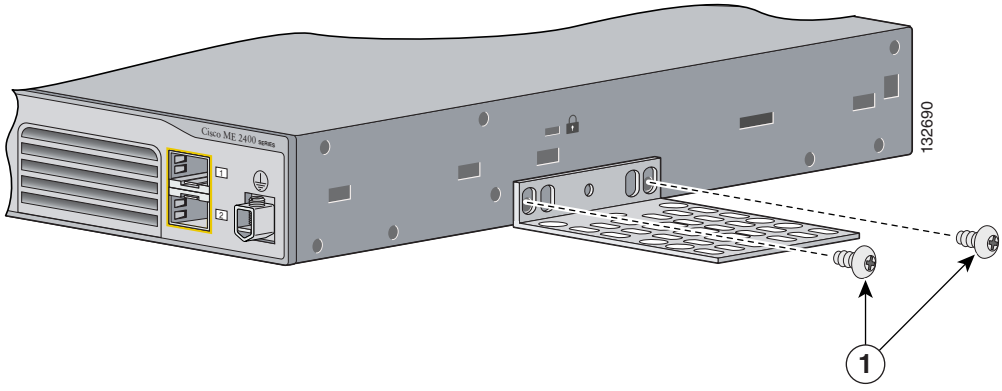
To install the switch on a wall, follow the instructions in these procedures:

- Attaching the Brackets to the Switch for Wall-Mounting, page 2-16
- Mounting the Switch on a Wall, page 2-17

Attaching the Brackets to the Switch for Wall-Mounting

Figure 2-17 shows how to attach a 19-inch bracket to one side of the switch. Follow the same steps to attach the second bracket to the opposite side.

Figure 2-17 Attaching the 19-inch Brackets for Wall-Mounting



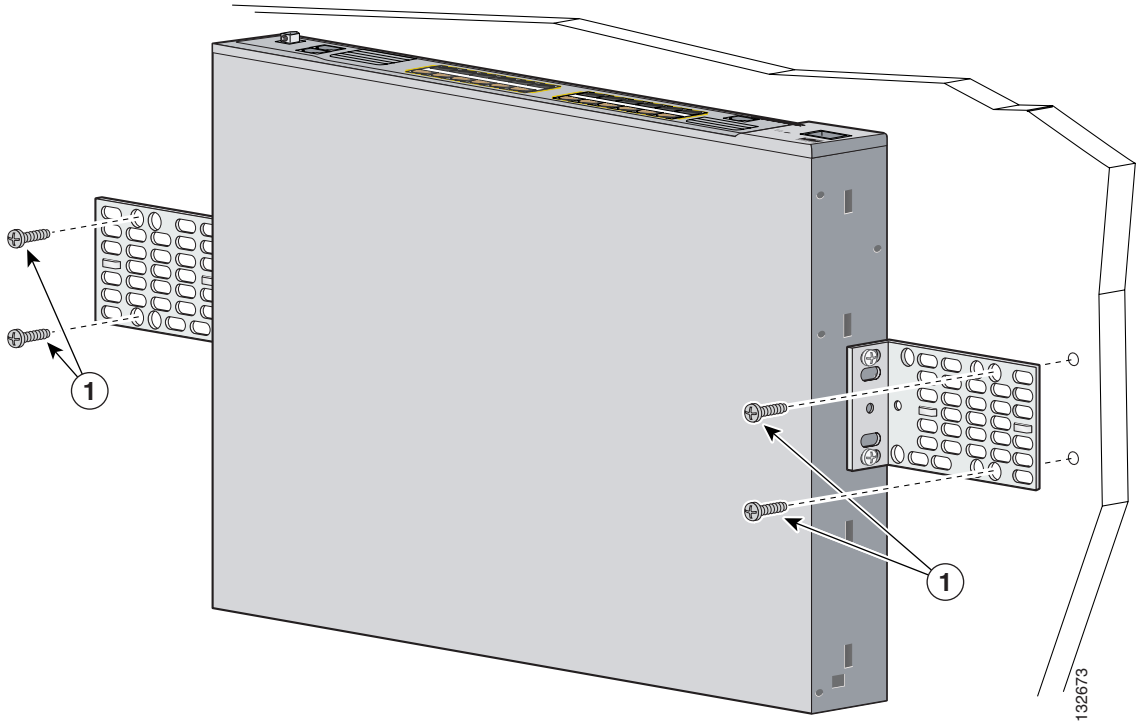
1	Cable guide screw

Mounting the Switch on a Wall

For the best support of the switch and cables, make sure the switch is attached securely to wall studs or to a firmly attached plywood mounting backboard. Mount the switch with the front panel facing up, as shown in Figure 2-18.

Warning **To comply with safety regulations, mount switches on a wall with the front panel facing up.** Statement 266

Figure 2-18 Mounting the Switch on a Wall



1	User-supplied screws

After the switch is mounted on the wall, you need to do these tasks to complete the installation:

- Power on the switch. See the "Verifying Switch Operation" section on page 2-7.
- Connect to a 10/100 port, and run the Initial Configuration Dialog. See the *Cisco ME 3400 and ME 2400 Ethernet Access Switches Getting Started Guide* for instructions.
- Connect to the front-panel ports. See the "Connecting to the 10/100 Ports" section on page 2-22 and the "Connecting to SFP Modules" section on page 2-23 to complete the installation.

For configuration instructions about using the CLI setup program, go to Appendix D, "Configuring the Switch with the CLI-Based Setup Program."

Table- or Shelf- Mounting

Follow these steps to install the switch on a table or shelf:

Step 1 Place the switch on the table or shelf near an AC power source.

Step 2 After the switch is placed on the table or shelf, you need to do these tasks to complete the installation:

- Power on the switch. See the "Verifying Switch Operation" section on page 2-7.
- Connect to a 10/100 port, and run the Initial Configuration Dialog. See the *Cisco ME 3400 and ME 2400 Ethernet Access Switches Getting Started Guide* for instructions.
- Connect to the front-panel ports. See the "Connecting to the 10/100 Ports" section on page 2-22 and the "Connecting to SFP Modules" section on page 2-23 to complete the installation.

For configuration instructions about using the CLI setup program, go to Appendix D, "Configuring the Switch with the CLI-Based Setup Program."

Note When the connectors are not being used, replace the dust covers on them for protection.

Installing and Removing SFP Modules

These sections describe how to install and remove SFP modules. The modules are inserted into the SFP module slots on the front of the Cisco ME switches. These field-replaceable modules provide uplink interfaces.

You can use any combination of SFP modules. See the Cisco ME switch release notes for the list of SFP modules that the Cisco ME switch supports. Each port must match the wave-length specifications on the other end of the cable, and for reliable communications, the cable must not exceed the stipulated cable length. See the "Installation Guidelines" section on page 2-4 for cable stipulations for SFP connections.

Use only Cisco SFP modules on the Cisco ME switch. Each SFP module has an internal serial EEPROM that is encoded with security information. This encoding provides a way for Cisco to identify and validate that the SFP module meets the requirements for the switch.

For detailed instructions on installing, removing, and cabling the SFP module, see the SFP module documentation.

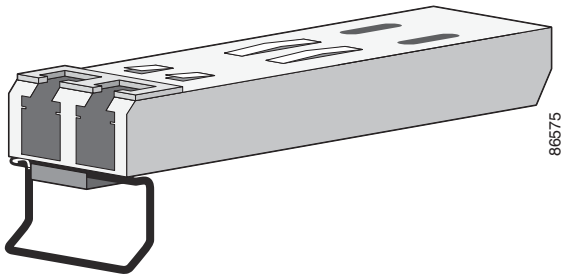
Installing SFP Modules into SFP Module Slots

Figure 2-19 shows an SFP module that has a bale-clasp latch.

Caution We strongly recommend that you do not install or remove fiber-optic SFP modules with cables attached because of the potential damage to the cables, the cable connector, or the optical interfaces in the SFP module. Disconnect all cables before removing or installing an SFP module.

Removing and installing an SFP module can shorten its useful life. Do not remove and insert SFP modules more often than is absolutely necessary.

Figure 2-19 SFP Module with a Bale-Clasp Latch



To insert an SFP module into the module slot, follow these steps (see Figure 2-20):

Step 1 Attach an ESD-preventive wrist strap to your wrist and to a bare metal surface on the chassis.

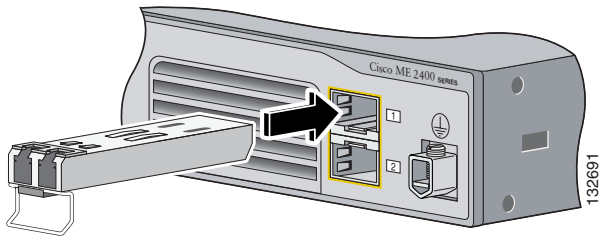
Step 2 Find the send (TX) and receive (RX) markings that identify the top side of the SFP module.

Note On some SFP modules, the send and receive (TX and RX) markings might be replaced by arrows that show the direction of the connection, either send or receive (TX or RX).

Step 3 Align the SFP module in front of the slot opening.

Step 4 Insert the SFP module into the slot until you feel the connector on the module snap into place in the rear of the slot.

Figure 2-20 Installing an SFP Module into an SFP Module Slot



Step 5 For fiber-optic SFP modules, remove the dust plugs from the optical ports, and store them for later use.

Caution Do not remove the dust plugs from the fiber-optic SFP module port or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the SFP module ports and cables from contamination and ambient light.

Step 6 Insert the cable connector into the SFP module:

- For fiber-optic SFP modules, insert the LC or MT-RJ cable connector into the SFP module.
- For copper 1000BASE-T SFP modules, insert the RJ-45 cable connector into the SFP module.

Note When connecting to 1000BASE-T SFP modules, be sure to use a twisted four-pair, Category 5 cable.

Removing SFP Modules from SFP Module Slots

To remove an SFP module from a module receptacle, follow these steps:

Step 1 Attach an ESD-preventive wrist strap to your wrist and to a bare metal surface on the chassis.

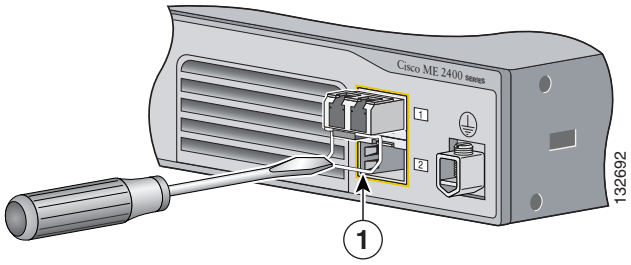
Step 2 Disconnect the cable from the SFP module, and insert a dust plug into the cable end.

Tip For reattachment, note which cable connector plug is send (TX) and which is receive (RX).

Step 3 Unlock and remove the SFP module, as shown in Figure 2-21.

If the module has a bale-clasp latch, pull the bale out and down to eject the module. If the bale-clasp latch is obstructed and you cannot use your index finger to open it, use a small, flat-blade screwdriver or other long, narrow instrument to open the bale-clasp latch.

Figure 2-21 Removing a Bale-Clasp Latch SFP Module by Using a Flat-Blade Screwdriver



1	Bale clasp

Step 4 Grasp the SFP module between your thumb and index finger, and carefully remove it from the module slot.

Step 5 For fiber-optic SFP modules, insert a dust plug into the optical ports of the SFP module to keep the optical interfaces clean.

Step 6 Place the removed SFP module in an antistatic bag or other protective environment.

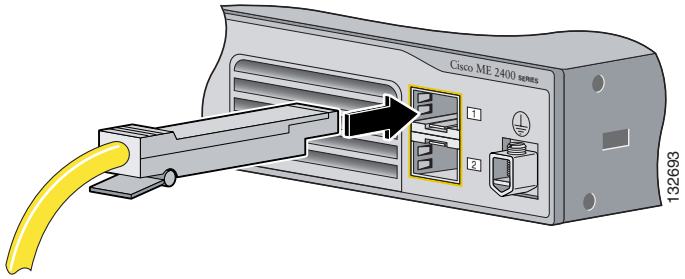
Inserting and Removing the SFP Module Patch Cable

To insert an SFP module patch cable into the SFP module slot, follow these steps:

Step 1 Attach an ESD-preventive wrist strap to your wrist and to a bare metal surface on the chassis.

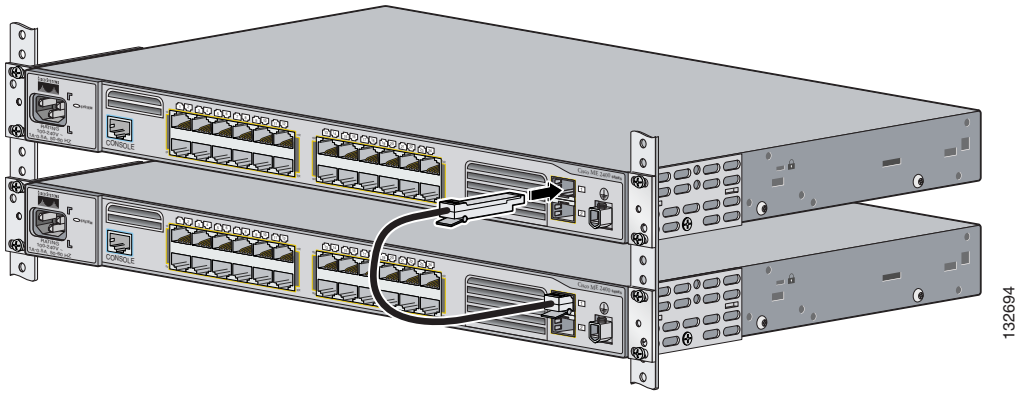
Step 2 Insert the SFP module patch cable into the slot until you feel the connector on the cable snap into place in the rear of the slot (see Figure 2-22).

Figure 2-22 Inserting an SFP Module Patch Cable into an SFP Module Slot



Step 3 Repeat these steps for the second Cisco ME switch to which you want to cascade the first switch. See Figure 2-23.

Figure 2-23 Connecting Two Cisco ME Switches with an SFP Module Patch Cable



To remove an SFP module patch cable from the SFP module slot, release the connector, and pull it from the SFP module slot.

Connecting to the 10/100 Ports

The switch 10/100 ports configure themselves to operate at the speed of attached devices. If the attached ports do not support autonegotiation, you can explicitly set the speed and duplex parameters. Connecting devices that do not autonegotiate or that have their speed and duplex parameters manually set can reduce performance or result in no linkage.

To maximize performance, choose one of these methods for configuring the Ethernet ports:

- Let the ports autonegotiate both speed and duplex.
- Set the port speed and duplex parameters on both ends of the connection.

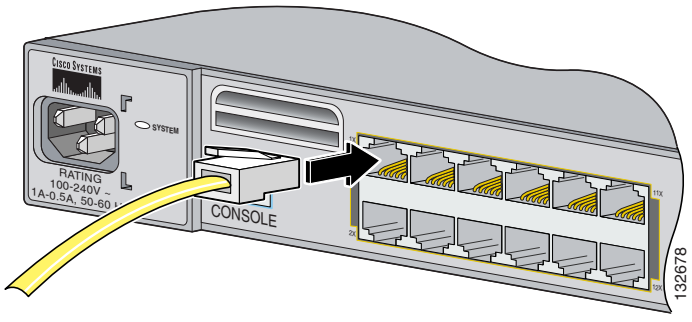
Follow these steps to connect to 10BASE-T or 100BASE-TX devices:

Step 1 When connecting to workstations, servers, and routers, connect a straight-through cable to an RJ-45 connector on the front panel. (See Figure 2-24.) When connecting to switches or repeaters, use a crossover cable. (See the "Cable and Adapter Specifications" section on page B-3 for cable-pinout descriptions.)

Note You can use the **mdix auto** interface configuration command in the CLI to enable the automatic medium-dependent interface crossover (auto-MDIX) feature. When the auto-MDIX feature is enabled, the switch detects the required cable type for copper Ethernet connections and configures the interfaces accordingly. Therefore, you can use either a crossover or a straight-through cable for connections to a copper 10/100 or 1000BASE-T SFP module port on the switch, regardless of the type of device on the other end of the connection.

Step 2 Connect the other end of the cable to an RJ-45 connector on the other device. The port LED turns on when both the switch and the connected device have established link. (See Figure 2-24.)

Figure 2-24 Connecting to an Ethernet Port



The port LED is amber while Spanning Tree Protocol (STP) discovers the topology and searches for loops. This takes about 30 seconds, and then the port LED turns green. If the port LED does not turn on, the device at the other end might not be turned on, or there might be a cable problem or a problem with the adapter installed in the attached device. See Chapter 3, "Troubleshooting," for solutions to cabling problems.

Note On user network interface (UNI) ports, the port LED is green after the link is established. It does not turn amber because. STP is not supported.

Step 3 Reconfigure and reboot the connected device, if necessary.

Step 4 Repeat Steps 1 through 3 to connect each device.

Connecting to SFP Modules

This section describes how to connect to SFP modules. For instructions on how to connect to fiber-optic SFP modules, see the "Connecting to Fiber-Optic SFP Modules" section. For instructions on how to connect to copper 1000BASE-T SFP modules, see the "Connecting to 1000BASE-T SFP Modules" section.

For instructions about how to install or remove an SFP module, see the "Installing and Removing SFP Modules" section on page 2-18.

Connecting to Fiber-Optic SFP Modules

Follow these steps to connect a fiber-optic cable to an SFP module:

Warning **Class 1 laser product.** Statement 1008

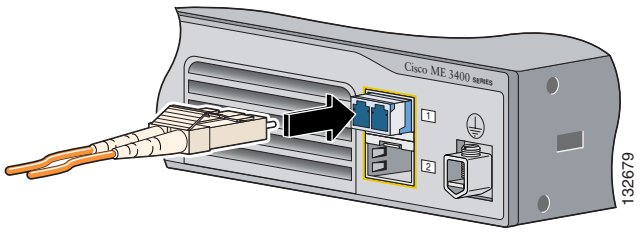
Caution Do not remove the rubber plugs from the SFP module port or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the SFP module ports and cables from contamination and ambient light.

Before connecting to the SFP module, be sure that you understand the port and cabling stipulations in the "Installation Guidelines" section on page 2-4 and in the "SFP Module Slots" section on page 1-4. See Appendix B, "Connector and Cable Specifications," for information about the LC on the SFP module.

Step 1 Remove the rubber plugs from the module port and fiber-optic cable, and store them for future use.

Step 2 Insert one end of the fiber-optic cable into the SFP module port (see Figure 2-25).

Figure 2-25 Connecting to a Fiber-Optic SFP Module Port



1	LC connector

Step 3 Insert the other cable end into a fiber-optic connector on a target device.

Step 4 Observe the port status LED.

The LED turns green when the switch and the target device have an established link.

The LED turns amber while the STP discovers the network topology and searches for loops. This process takes about 30 seconds, and then the port LED turns green.

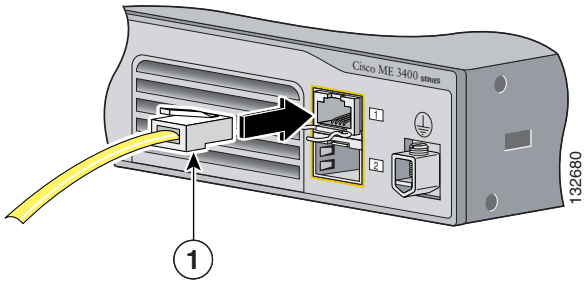
If the LED is off, the target device might not be turned on, there might be a cable problem, or there might be problem with the adapter installed in the target device. See Chapter 3, "Troubleshooting," for solutions to cabling problems.

Step 5 If necessary, reconfigure and restart the switch or target device.

Connecting to 1000BASE-T SFP Modules

Follow these steps to connect a Category 5 cable to a 1000BASE-T SFP module (see Figure 2-26):

Figure 2-26 Connecting to a 1000BASE-T SFP Module



1	RJ-45 connector

Caution To prevent ESD damage, follow your normal board and component handling procedures.

Step 1 When connecting to servers, workstations, and routers, insert a four twisted-pair, straight-through cable in the RJ-45 connector. When connecting to switches or repeaters, insert a four twisted-pair, crossover cable.

Note When connecting to a 1000BASE-T device, be sure to use a four twisted-pair, Category 5 cable.

Note You can use the **mdix auto** interface configuration command in the CLI to enable the automatic medium-dependent interface crossover (auto-MDIX) feature. When the auto-MDIX feature is enabled, the switch detects the required cable type for copper Ethernet connections and configures the interfaces accordingly. Therefore, you can use either a crossover or a straight-through cable for connections to a copper 10/100 or 1000BASE-T SFP module port on the switch, regardless of the type of device on the other end of the connection.

Step 2 Insert the other cable end in an RJ-45 connector on a target device.

Step 3 Observe the port status LED.

The LED turns green when the switch and the target device have an established link.

The LED turns amber while the STP discovers the network topology and searches for loops. This process takes about 30 seconds, and then the port LED turns green.

If the LED is off, the target device might not be turned on, there might be a cable problem, or there might be problem with the adapter installed in the target device. See Chapter 3, "Troubleshooting," for solutions to cabling problems.

Step 4 If necessary, reconfigure and restart the switch or target device.

Where to Go Next

If the default configuration is satisfactory, the switch does not need further configuration. You can use any of these management options to change the default configuration:

- Use the CLI from the console to configure the switch. See the switch software configuration guide or the switch command reference on for information about using the CLI with a Cisco ME switch.

  For setup instructions that use the CLI setup program, go to Appendix D, "Configuring the Switch with the CLI-Based Setup Program."

- Start an SNMP application such as the CiscoView application.

Troubleshooting

The System and port LEDs on the front panel provide troubleshooting information about the switch. They show failures in the power-on self-test (POST), port-connectivity problems, and overall switch performance. For a full description of the switch LEDs, see the "LEDs" section on page 1-5.

You can also get statistics from the browser interface, from the command-line interface (CLI), or from a Simple Network Management Protocol (SNMP) workstation. See the switch software configuration guide, the switch command reference, or the documentation that came with your IE2100 or SNMP application for details.

This chapter describes these topics for troubleshooting problems:

- Understanding POST Results, page 3-1
- Diagnosing Problems, page 3-1

Understanding POST Results

When the switch powers on, it automatically begins the POST, a series of tests that verifies that the switch functions properly. When the switch begins POST, the system LED slowly blinks green. When POST completes, the system LED blinks amber. If POST fails, the system LED remains amber. If POST completes successfully, the system LED rapidly blinks green.

Note POST failures are usually fatal. Call Cisco Systems if your switch does not pass POST.

Diagnosing Problems

Common switch problems fall into these categories:

- Poor performance
- No connectivity
- Corrupted software

Table 3-1 describes how to detect and resolve these problems.

Table 3-1 Common Problems and Their Solutions

Symptom	Possible Cause	Resolution
Poor performance or excessive errors	Duplex autonegotiation mismatch.	See the switch software configuration guide for information on identifying autonegotiation mismatches.
	Cabling distance exceeded	
	• Port statistics show excessive frame check sequence (FCS), late-collision, or alignment errors.	• See the switch software configuration guide for information on displaying port statistics.
	• For 10/100BASE-TX connections:	
	– The distance between the port and the attached device exceeds 328 feet (100 meters).	• Reduce the cable length to within the recommended distances.
	– If the switch is attached to a repeater, the total distance between the two end stations exceeds the cabling guidelines.	• See your repeater documentation for cabling guidelines.
	• For SFP module port connections:	• See your SFP module documentation for cabling guidelines.
	– The distance between the SFP module port and the attached device exceeds the SFP module cabling guidelines.	

Table 3-1 Common Problems and Their Solutions (continued)

Symptom	Possible Cause	Resolution
No connectivity	**Incorrect or bad cable** These are results of no link at both ends:	
	• A crossover cable was used when a straight-through was required, or the reverse.	• For the correct pinouts and the proper application of crossover instead of straight-through cables, see the "Two Twisted-Pair Cable Pinouts" section on page B-3.
		• Enable the automatic medium-dependent-interface crossover (auto-MDIX) feature.
	• The cable is wired incorrectly.	• Replace with a tested good cable.
	• A crossover or straight-through cable is wired incorrectly.	• For 1000BASE-T connections, be sure to use a twisted four-pair, Category 5 cable.
	• STP checking for possible loops. STP is available only on network node interfaces (NNIs).	• Wait 30 seconds for the port LED to turn green.
Unreadable characters on the management console	Incorrect baud rate.	Reset the emulation software to 9600 baud.
Amber system LED	Fatal POST error detected.	Contact Cisco Systems.
The switch port is placed in error-disabled state after SFP module is inserted	Bad or non-Cisco-approved SFP module.	Remove the SFP module from the switch, and replace it with a Cisco-approved module. Use the **errdisable recovery cause gbic-invalid** global configuration command to verify the port status, and enter a time interval to recover from the error-disabled state. See the switch command reference guide for information on the **errdisable recovery** command.

Table 3-1 Common Problems and Their Solutions (continued)

Symptom	Possible Cause	Resolution
Switch does not recognize the SFP module	The SFP module might be installed upside down. The SFP module does not snap into the slot.	Verify that the SFP module is not installed upside down. Remove the SFP module. Inspect for physical damage to the connector, the module, and the module slot. Replace the SFP module with a known good SFP module.
The switch port is placed in error-disabled state after an SFP module is inserted	Bad or non-Cisco-approved SFP module.	Remove the SFP module from the switch, and replace it with a Cisco-approved module. Use the **errdisable recovery cause gbic-invalid** global configuration command to verify the port status, and enter a time interval to recover from the error-disabled state. Refer to the switch command reference guide for information on the **errdisable recovery** command.

Technical Specifications

This appendix lists the switch technical specifications in Table A-1.

Table A-1 Technical Specifications for the Cisco ME 2400 Ethernet Access Switch

Environmental Ranges	
Operating temperature	32 to 113°F (0 to 50°C)
Storage temperature	–13 to 158°F (– 25 to 70°C)
Relative humidity	10 to 85% (noncondensing)
Operating altitude	Up to 10,000 ft (3049 m)
Storage altitude	Up to 15,000 ft (4573 m)
AC Power Requirements	
AC input voltage	100 to 240 VAC 0.5 to 1 A, 50 to 60 Hz
Power consumption	25 W (typical), 30 W (maximum), 102 BTUs per hour
Power dissipation	25 W
Power rating	0.042 KVA
DC Power Requirements	
DC input voltage	–36 to –72 VDC, 1 to 2 A
Power consumption	25 W (typical), 30 W (maximum), 102 BTUs per hour
Power dissipation	25 W
Physical Dimensions	
Weight	8.2 lb (3.72 kg)
Dimensions (H x D x W)	1.75 x 17.5 x 9.52 in. (4.45 x 444.5 x 24.18 cm)

Connector and Cable Specifications

This appendix describes the Cisco ME switch ports and the cables and adapters that you use to connect the switch to other devices.

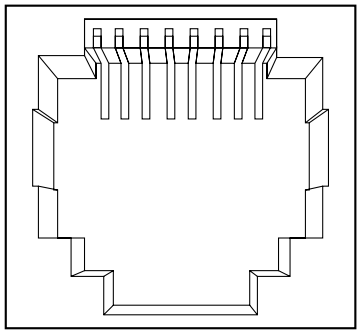
Connector Specifications

These sections describe the connectors used with the switch.

10/100 Ports

The 10/100 Ethernet ports use standard RJ-45 connectors and Ethernet pinouts with internal crossovers. These ports have the send (TD) and receive (RD) signals internally crossed so that a twisted-pair straight-through cable and adapter can be attached to the port. Figure B-1 shows the pinout for a 10/100 port.

Figure B-1 10/100 Port Pinouts

Pin	Label	1 2 3 4 5 6 7 8
1	RD+	
2	RD-	
3	TD+	
4	NC	
5	NC	
6	TD-	
7	NC	
8	NC	

When connecting 10/100 ports to compatible devices such as servers, workstations, and routers, you can use a two or four twisted-pair straight-through cable wired for 10BASE-T and 100BASE-TX. Figure B-4 shows the two twisted-pair straight-through cable schematics. Figure B-6 shows the four twisted-pair straight-through cable schematics.

When connecting the ports to other devices, such as switches or repeaters, you can use a two or four twisted-pair crossover cable. Figure B-5 shows the two twisted-pair crossover cable schematics. Figure B-7 shows the four twisted-pair crossover cable schematics.

Note You can use the **mdix auto** interface configuration command in the CLI to enable the automatic medium-dependent interface crossover (auto-MDIX) feature. When the auto-MDIX feature is enabled, the switch detects the required cable type for copper Ethernet connections and configures the interfaces accordingly. Therefore, you can use either a crossover or a straight-through cable for connections to a copper 10/100, 10/100/1000, or 1000BASE-T SFP module port on the switch, regardless of the type of device on the other end of the connection.

You can use Category 3, 4, or 5 cabling when connecting to 10BASE-T-compatible devices. You must use Category 5 cabling when connecting to 100BASE-TX-compatible devices.

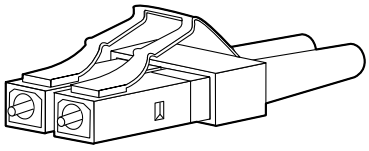
Note Use a straight-through cable to connect two ports only when one port is designated with an X. Use a crossover cable to connect two ports when both ports are designated with an X or when both ports do not have an **X**.

This applies only to switches on which auto-MDIX is disabled.

SFP Module Ports

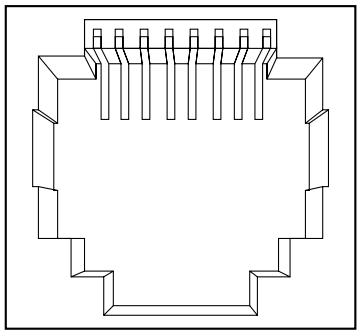
The Cisco ME switch uses SFP modules for fiber-optic and copper uplinks. See the Cisco ME switch release notes for a list of supported SFP modules.

Figure B-2 Fiber-Optic SFP Module LC Connector



Warning **Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.** Statement 1051

Figure B-3 Copper SFP Module RJ-45 Connector

Pin	Label	1 2 3 4 5 6 7 8
1	TP0+	
2	TP0-	
3	TP1+	
4	TP2+	
5	TP2-	
6	TP1-	
7	TP3+	
8	TP3-	

60915

Console Port

The console port uses an 8-pin RJ-45 connector, which is described in Table B-1 and Table B-2. If you did not order a console cable with your switch, you need to provide an RJ-45-to-DB-9 adapter cable to connect the console port of the switch to a console PC. You need to provide a RJ-45-to-DB-25 female DTE adapter if you want to connect the switch console port to a terminal. You can order a kit (part number ACS-DSBUASYN=) containing that adapter from Cisco. For console port and adapter pinout information, see Table B-1 and Table B-2.

Cable and Adapter Specifications

These sections describe the cables and adapters used with Cisco ME switches.

Two Twisted-Pair Cable Pinouts

Figure B-4 and Figure B-5 show the schematics of two twisted-pair cables for connecting to 10BASE-T- and 100BASE-TX-compatible devices.

Figure B-4 Two Twisted-Pair Straight-Through Cable Schematic

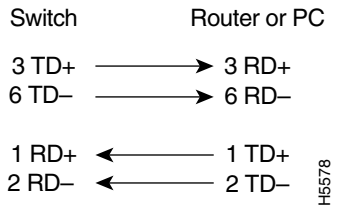
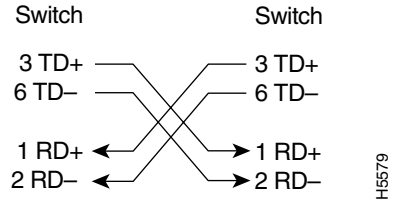


Figure B-5 Two Twisted-Pair Crossover Cable Schematic



Four Twisted-Pair Cable Pinouts for 1000BASE-T Ports

Figure B-6 and Figure B-7 show the schematics of four twisted-pair cables for 1000BASE-T SFP module ports on Cisco ME switches.

Figure B-6 Four Twisted-Pair Straight-Through Cable Schematic for 1000BASE-T Ports

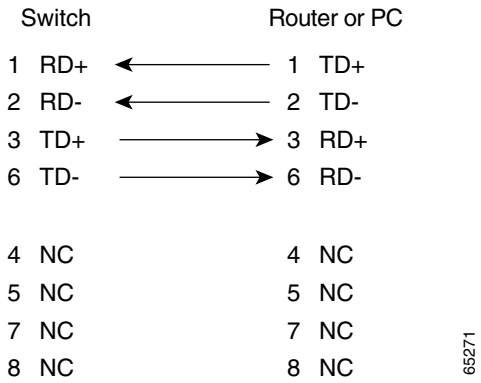
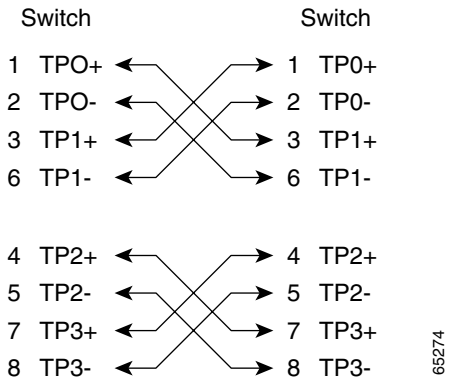


Figure B-7 Four Twisted-Pair Crossover Cable Schematics for 1000BASE-T Ports



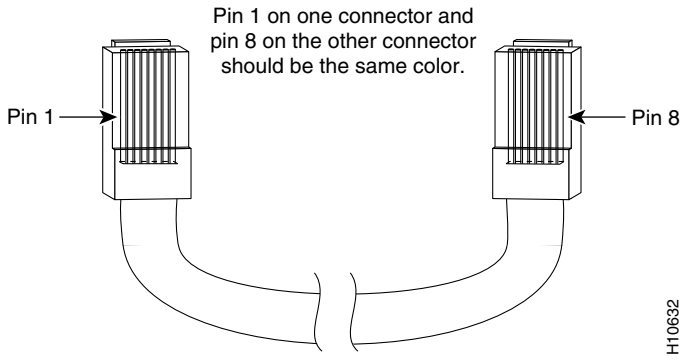
Crossover Cable and Adapter Pinouts

This section describes how to identify a crossover cable and also describes the adapter pinouts.

Identifying a Crossover Cable

To identify a crossover cable, compare the two modular ends of the cable. Hold the cable ends side-by-side, with the tab at the back. The wire connected to the pin on the outside of the left plug should be the same color as the wire connected to the pin on the outside of the right plug. (See Figure B-8.)

Figure B-8 Identifying a Crossover Cable



Adapter Pinouts

Table B-1 lists the pinouts for the console port, the RJ-45-to-DB-9 adapter cable, and the console device.

Table B-1 Console Port Signaling Using a DB-9 Adapter

Switch Console Port (DTE)	RJ-45-to-DB-9 Terminal Adapter	Console Device
Signal	**DB-9 Pin**	**Signal**
RTS	8	CTS
DTR	6	DSR
TxD	2	RxD
GND	5	GND
GND	5	GND
RxD	3	TxD
DSR	4	DTR
CTS	7	RTS

Table B-2 lists the pinouts for the console port, RJ-45-to-DB-25 female DTE adapter, and the console device.

Note The RJ-45-to-DB-25 female DTE adapter is not supplied with the switch. You can order a kit (part number ACS-DSBUASYN=) containing this adapter from Cisco.

Table B-2 Console Port Signaling Using a DB-25 Adapter

Switch Console Port (DTE)	RJ-45-to-DB-25 Terminal Adapter	Console Device
Signal	**DB-25 Pin**	**Signal**
RTS	5	CTS
DTR	6	DSR
TxD	3	RxD
GND	7	GND
GND	7	GND
RxD	2	TxD
DSR	20	DTR
CTS	4	RTS

Connecting to DC Power

To connect the Cisco ME switch to a DC-input power source, follow these steps:

1. Preparing for Installation, page C-1
2. Grounding the Switch, page C-2
3. Wiring the DC-Input Power Source, page C-5

Warning **Ethernet cables must be shielded when used in a central office environment.** Statement 171

Warning **This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security.** Statement 1017

Caution Installation of the equipment must comply with local and national electrical codes.

Note We recommend that you use 18 AWG copper wiring for Network Equipment Building Systems (NEBS) installation. This guideline follows the standard guidelines for DC power wiring in the Central Office.

Note You can use the grounding lug to attach a wrist strap for ESD protection during servicing.

Preparing for Installation

Locate the DC terminal block plug, the ground lug, and the two number-10-32 screws in the DC-switch kit.

Obtain these necessary tools and equipment:

- Ratcheting torque screwdriver with a Phillips head that exerts up to 15 pound-force inches (lbf-in.) of pressure
- Panduit crimping tool with optional controlled cycle mechanism (model CT-700, CT-720, CT-920, CT-920CH, CT-930, or CT-940CH)

- 6-gauge copper ground wire (insulated or noninsulated)
- Four leads of 18-gauge copper wire
- Wire-stripping tools for stripping 6- and 18-gauge wires

Grounding the Switch

Warning **This equipment is intended to be grounded. Ensure that the host is connected to earth ground during normal use.** Statement 39

Warning **When installing the unit, always make the ground connection first and disconnect it last.** Statement 42

Caution To make sure that the equipment is reliably connected to earth ground, follow the grounding procedure instructions, and use a UL-listed lug suitable for number-6 AWG wire and two number-10-32 ground-lug screws.

Preparing the Ground Wire

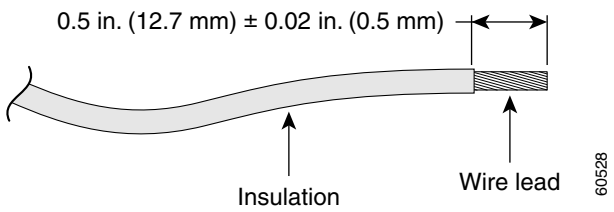
Before you ground the switch to earth ground, you must prepare the ground wire. Follow these steps. Make sure to follow any grounding requirements at your site.

Step 1 Locate the ground lug and the two number-10-32 screws. A ground lug and screws are located both on the front panel and on the rear panel of the switch. Only one ground connection is required.

Use a standard Phillips screwdriver or a ratcheting torque screwdriver with a Phillips head. Set the screws and the ground lug aside.

Step 2 If your ground wire is insulated, use a wire stripping tool to strip the 6-gauge ground wire to 0.5 inch (12.7 millimeter [mm]) ± 0.02 inch (0.5 mm) as shown in Figure C-1.

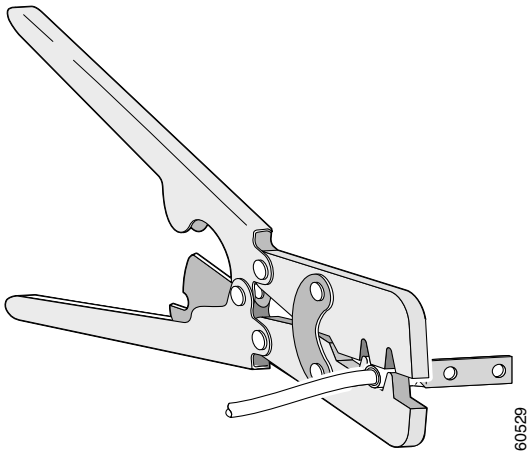
Figure C-1 Stripping the Ground Wire



Step 3 Slide the open end of the ground lug over the exposed area of the 6-gauge wire.

Step 4 Using a Panduit crimping tool, crimp the ground lug to the 6-gauge wire.

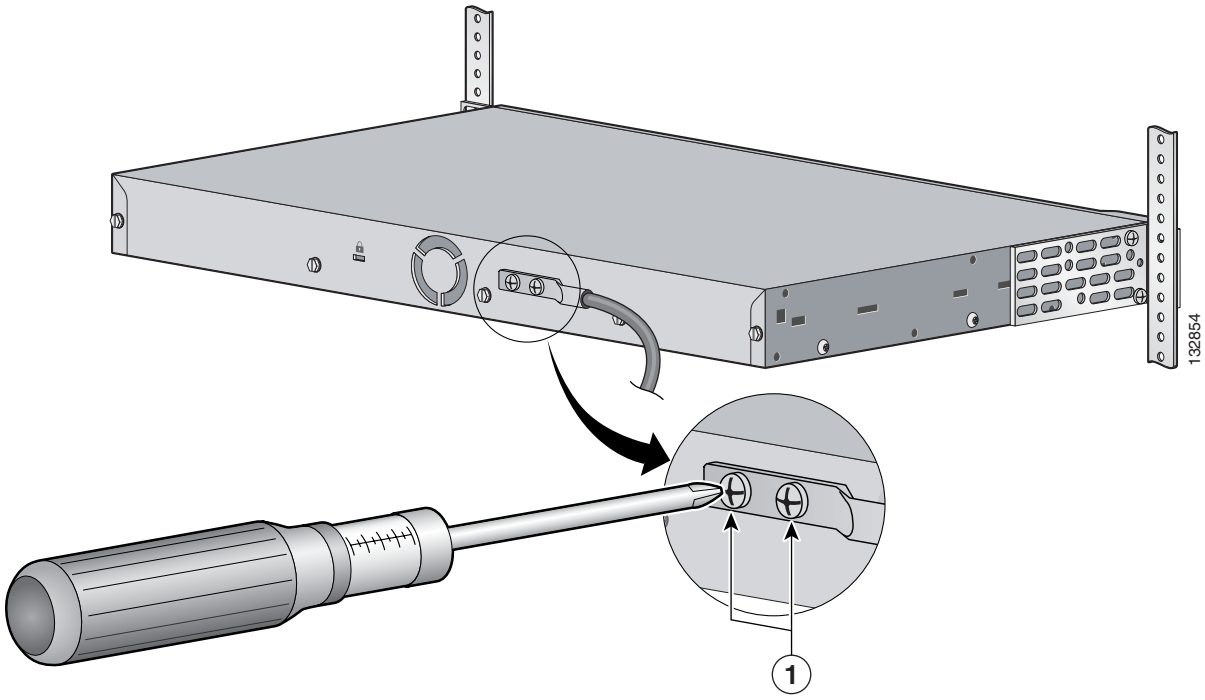
Figure C-2 Crimping the Ground Lug



Step 5 Use the two number-10-32 screws to attach the ground lug and wire assembly to the rear panel of the switch.

Step 6 Using a ratcheting torque screwdriver, torque each ground-lug screw to 15 lbf-in. (240 ounce-force inches [ozf-in.]). Figure C-3 shows how to torque the ground screws on a Cisco ME DC switch.

Figure C-3 Torquing Ground-Lug Screws

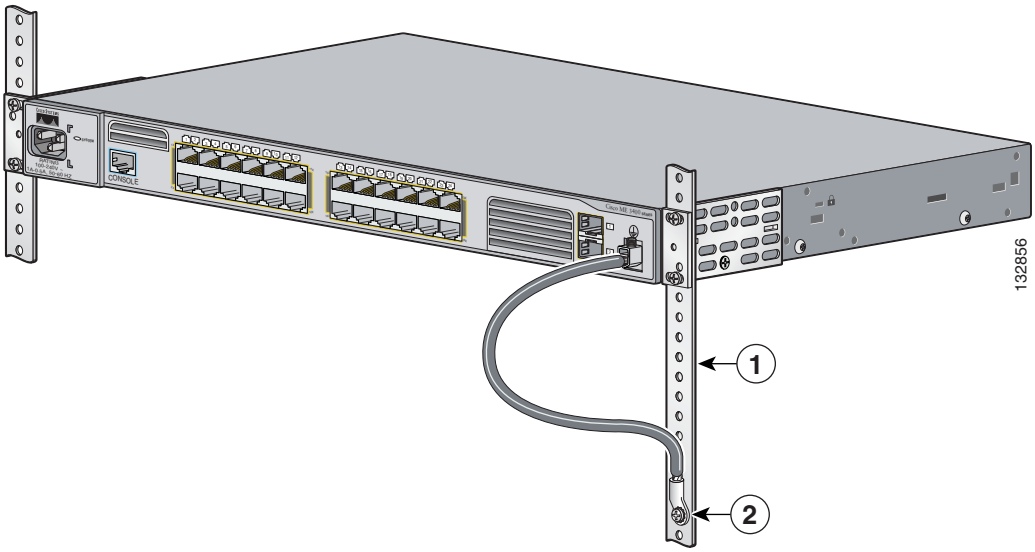


1	Torque to 15 lbf-in.

Connecting the Grounding Wire to Earth Ground

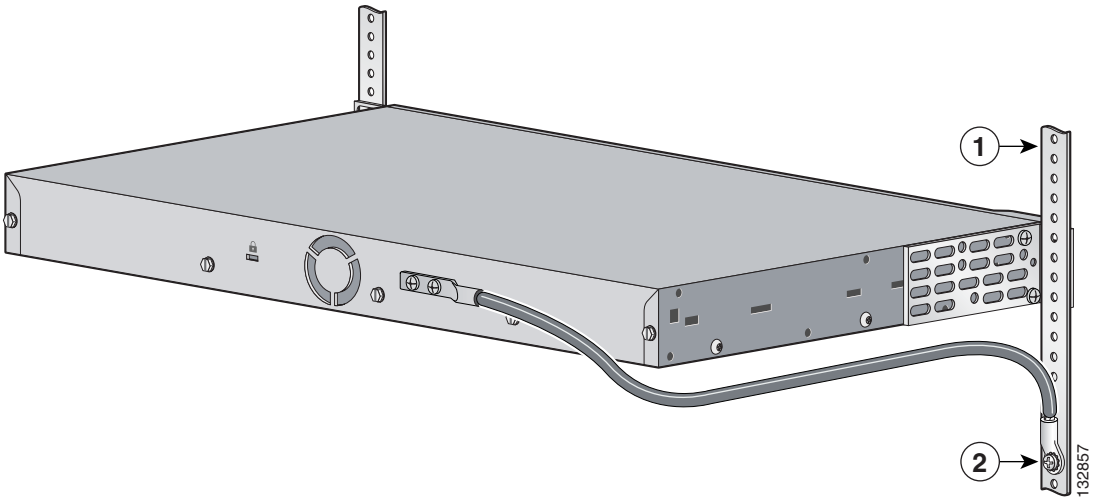
Next you must connect the other end of the grounding wire to an appropriate grounding point at your site or to the telco rack. You can connect the grounding wire to either the front panel ground connector (see Figure C-4) or the rear panel ground connector (see Figure C-5), but not to both.

Figure C-4 Connecting the Grounding Wire to the Rack (Grounding) from the Front-Panel Ground Connector



1	Telco rack	**2**	Grounding wire

Figure C-5 Connecting the Grounding Wire to the Rack (Grounding) from the Rear-Panel Ground Connector



1	Telco rack	**2**	Grounding wire

Complete these steps:

Step 1 Remove all paint or oxidation from the rack at the point of the grounding connection.

Step 2 Use a 3/16-inch flat-head screwdriver to loosen the grounding screw on the rack.

Step 3 Connect the wire to a ring lug (large enough for the rack screw to fit through).

Step 4 Use a 3/16-inch flat-head screwdriver and the screw to attach the ring lug to the rack.

Step 5 Tighten the grounding screw on the rack over the ring lug.

Repeat these steps for each switch being installed.

Wiring the DC-Input Power Source

Warning **Before performing any of the following procedures, ensure that power is removed from the DC circuit.** Statement 1003

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than:**
5 A Statement 1005

Warning **A readily accessible two-poled disconnect device must be incorporated in the fixed wiring.** Statement 1022

Warning **Only trained and qualified personnel should be allowed to install or replace this equipment.** Statement 1030

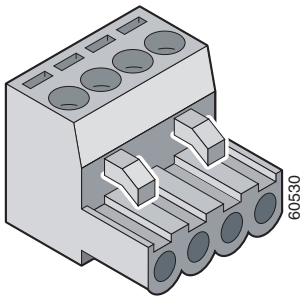
Caution You must connect the Cisco ME DC switch only to a DC-input power source that has an input supply voltage from –36 to –72 VDC. If the supply voltage is not in this range, the switch might not operate properly or might be damaged.

To wire the switch to a DC-input power source, follow these steps:

Step 1 To ensure that all power is OFF, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the switch handle of the circuit breaker in the OFF position.

Step 2 Locate the terminal block plug (see Figure C-6).

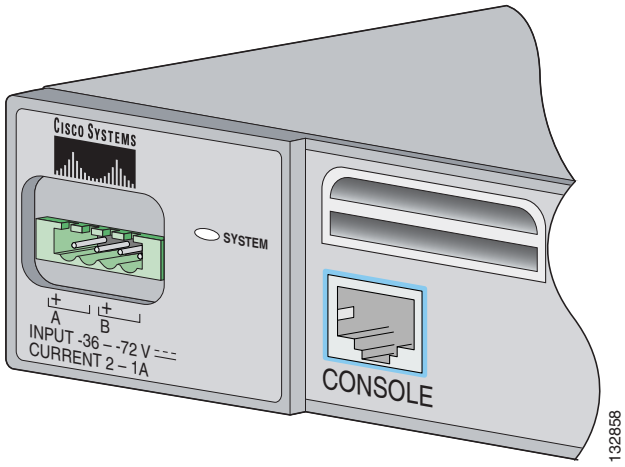
Figure C-6 Terminal Block Plug



Step 3 Identify the positive and negative feed positions for the terminal block connection. The wiring sequence is positive to positive and negative to negative for both the A and the B feed wires.

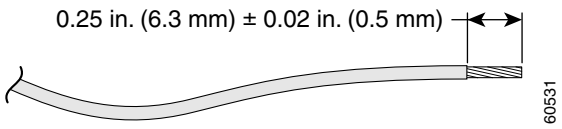
The front panel of the switch identifies the positive and negative positions for both the A and B feed wires (See Figure C-7.)

Figure C-7 Positive and Negative Positions



Step 4 Using an 18-gauge wire-stripping tool, strip each of the four wires coming from the DC-input power source to 0.27 inch (6.6 mm) ± 0.02 inch (0.5 mm). Do not strip more than 0.29 inch (7.4 mm) of insulation from the wire. Stripping more than the recommended amount of wire can leave exposed wire from the terminal block plug after installation.

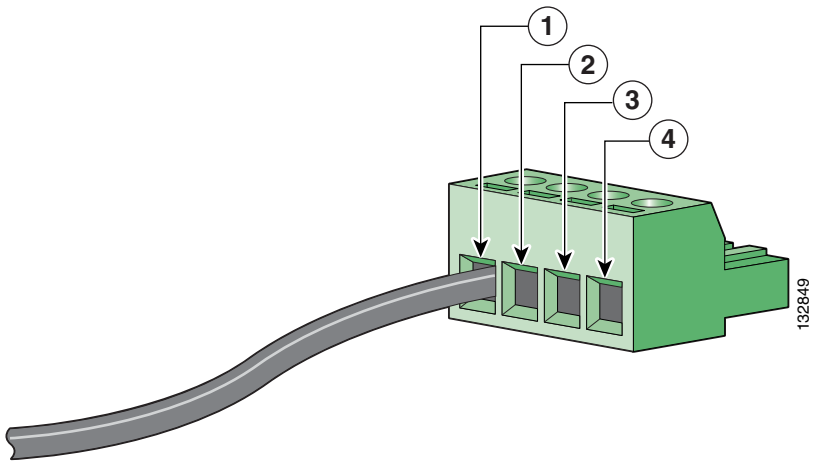
Figure C-8 Stripping the DC-Input Power Source Wire



Step 5 Insert the exposed wire of one of the four DC-input power source wires into the terminal block plug, as shown in Figure C-9. Make sure that you cannot see any wire lead. Only wire *with insulation* should extend from the terminal block.

Warning **An exposed wire lead from a DC-input power source can conduct harmful levels of electricity. Be sure that no exposed portion of the DC-input power source wire extends from the terminal block plug.** Statement 122

Figure C-9 Inserting Wires in the Terminal Block Plug

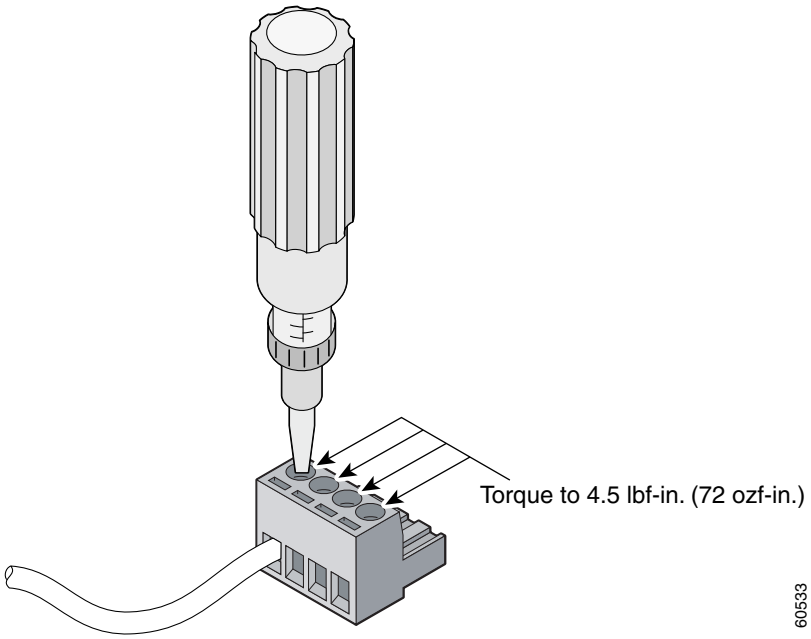


1	Return (positive) Feed A	**3**	Return (positive) Feed B
2	Supply (negative) Feed A	**4**	Supply (negative) Feed B

Step 6 Use a ratcheting torque screwdriver to torque the terminal block captive screw (above the installed wire lead) to 4.5 lbf-in. (72 ozf-in.). (See Figure C-10.)

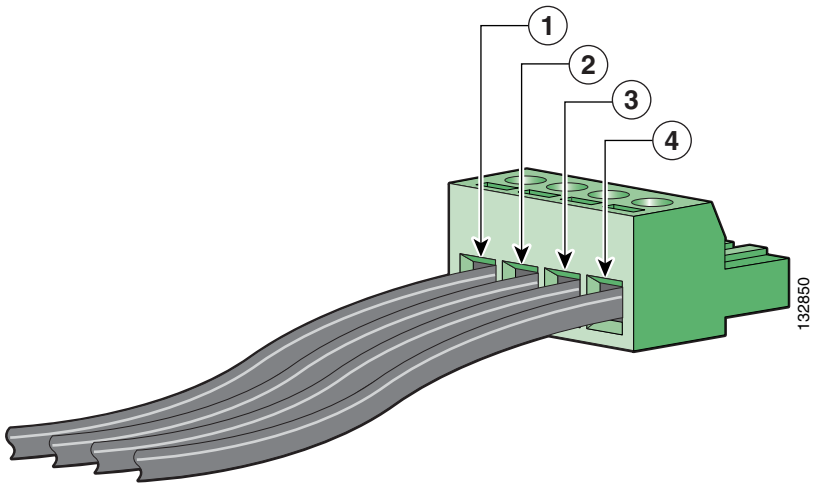
Caution Do not overtorque the terminal-block captive screws. The recommended maximum torque is 4.5 lbf-in.

Figure C-10 Torquing the Terminal-Block Captive Screws



Step 7 Repeat Steps 4 and 5 for the remaining three DC-input power source wires. Figure C-11 shows the completed wiring of a terminal block plug.

Figure C-11 Completed Wiring of Terminal Block Plug

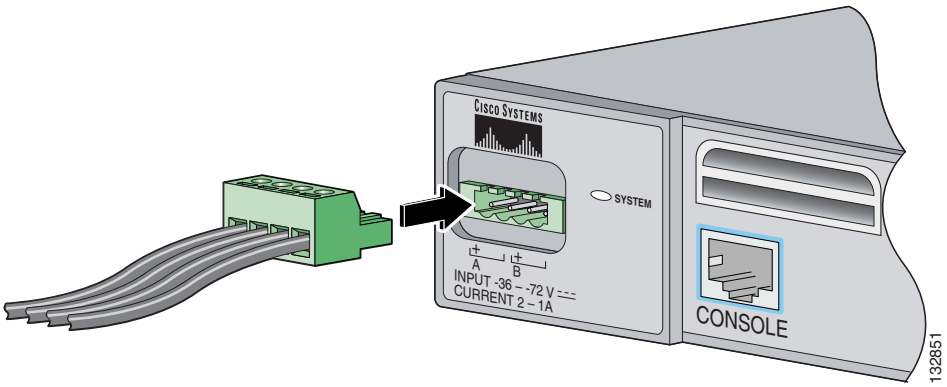


1	Return (positive) Feed A	**3**	Return (positive) Feed B
2	Supply (negative) Feed A	**4**	Supply (negative) Feed B

Step 8 Insert the terminal block plug in the terminal block header on the front panel of the switch. (See Figure C-12).

Caution Secure the wires coming in from the terminal block so that they cannot be disturbed by casual contact. For example, use tie wraps to secure the wires to the rack.

Figure C-12 Inserting the Terminal Block in the Block Header



Step 9 Remove the tape from the circuit-breaker switch handle, and move the circuit-breaker handle to the on position.

Configuring the Switch with the CLI-Based Setup Program

This appendix provides a command-line interface (CLI)-based setup procedure for a standalone switch. For product overview information, see Chapter 1, "Product Overview." Before connecting the switch to a power source, review the safety warnings in Chapter 2, "Switch Installation." For installation procedures on rack-mounting your switch, connecting to the switch ports, or connecting to the small form-factor pluggable (SFP) modules, see Chapter 2, "Switch Installation."

These steps describe how to do a simple installation:

1. Accessing the CLI Through the Console Port, page D-1
2. Taking Out What You Need, page D-2
3. Connecting to the Console Port, page D-3
4. Starting the Terminal-Emulation Software, page D-4
5. Connecting to a Power Source, page D-5
6. Entering the Initial Configuration Information, page D-5

Accessing the CLI Through the Console Port

You can access the CLI on a configured or unconfigured switch by connecting the console port of the switch to the serial port on your PC or workstation and accessing the switch through a Telnet session.

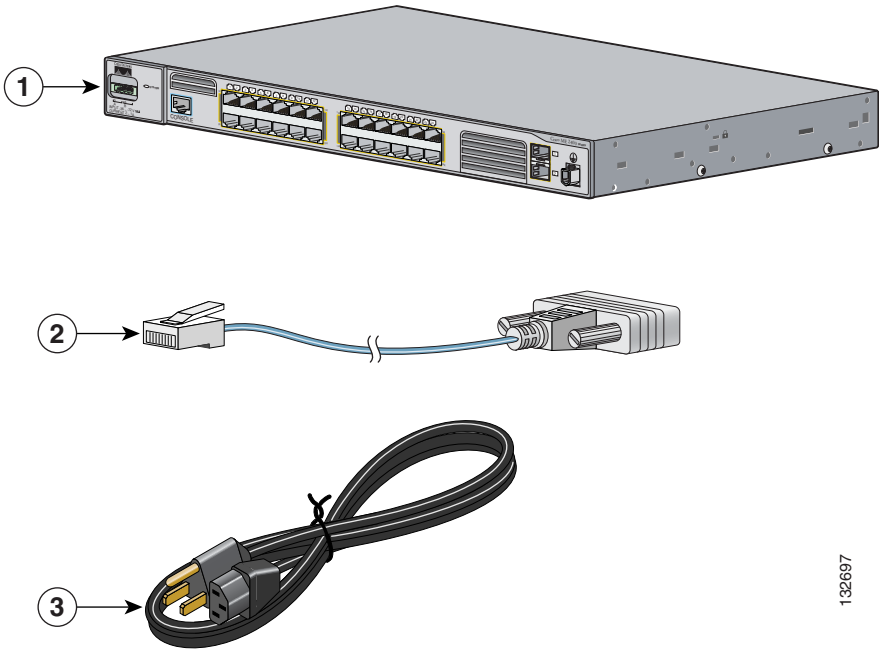
To access the switch through the console port, follow these steps:

- "Taking Out What You Need" section on page D-2.
- "Connecting to the Console Port" section on page D-3
- "Starting the Terminal-Emulation Software" section on page D-4
- "Connecting to a Power Source" section on page D-5
- "Entering the Initial Configuration Information" section on page D-5

Taking Out What You Need

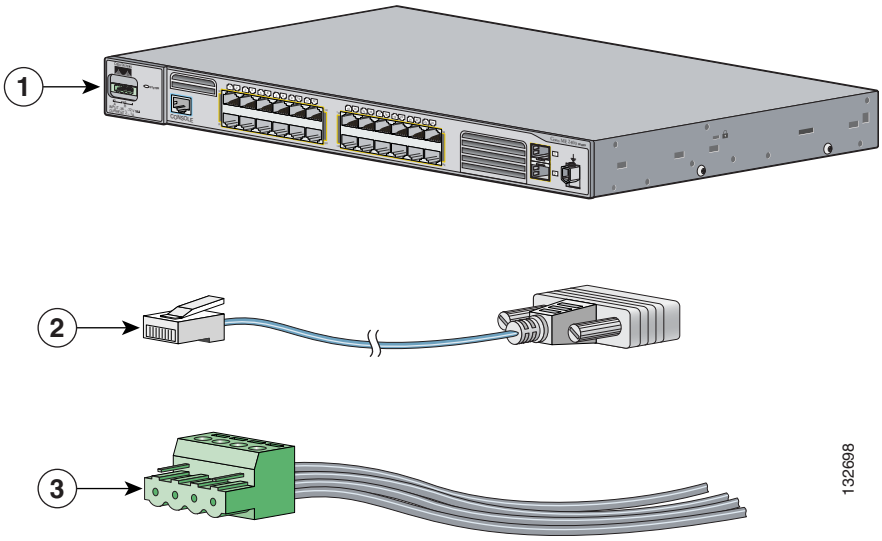
Remove the items shown in Figure D-1 from the shipping container:

Figure D-1 The Cisco ME Switch, Adapter Cable, and AC Power Cord



1	Cisco ME AC switch	2	AC power cord

Figure D-2 The Cisco ME Switch, Adapter Cable, and DC Power Cord



1	Cisco ME DC switch	2	DC power cord

Note You need to provide the Category 5 straight-through cables to connect the switch ports to other Ethernet devices.

Note You can use the CLI **mdix auto** interface configuration command to enable the automatic medium-dependent interface crossover (auto-MDIX) feature. When the auto-MDIX feature is enabled, the switch detects the required cable type for copper Ethernet connections and configures the interfaces accordingly. Therefore, you can use either a crossover or a straight-through cable for connections to a copper 10/100 or 1000BASE-T SFP module port on the switch, regardless of the type of device on the other end of the connection.

Connecting to the Console Port

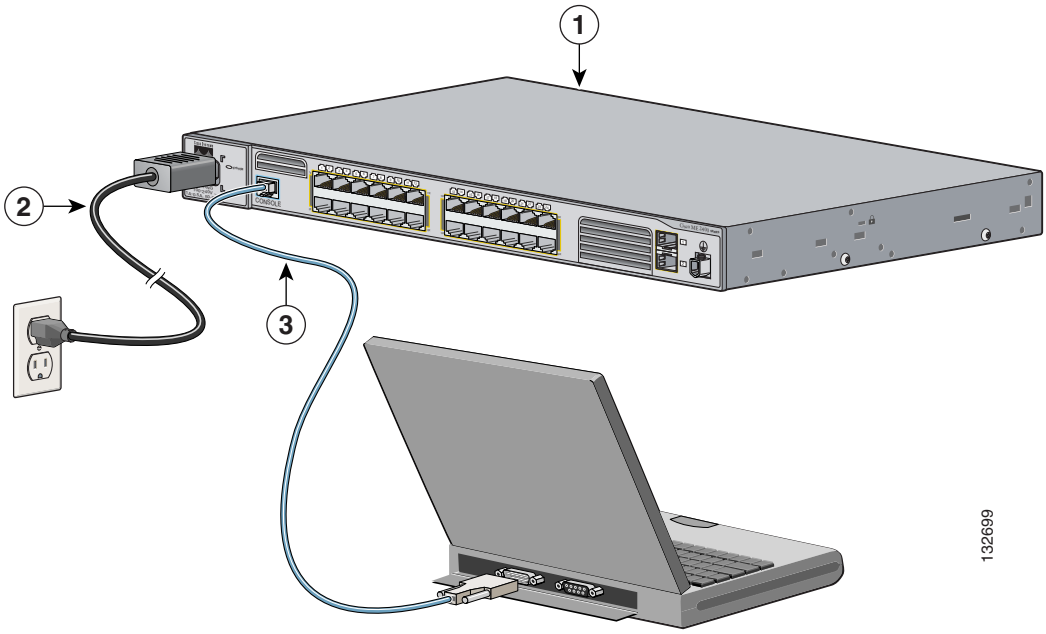
You can use the console port to perform the initial configuration. To connect the switch console port to a PC, use an RJ-45-to-DB-9 adapter cable. You must supply this cable if you did not order it with your switch.

Follow these steps to connect the PC or terminal to the switch:

Step 1 Using an RJ-45-to-DB-9 adapter cable, insert the RJ-45 connector into the console port on the rear of a switch, as shown in Figure D-1 and Figure D-2.

Step 2 Attach the DB-9 female DTE of the adapter cable to a PC serial port, or attach an appropriate adapter to the terminal.

Figure D-3 Connecting the Switch to a PC



1	Cisco ME switch	**3**	RJ-45-to-DB-9 adapter cable (user supplied)
2	Power cord		

See Appendix C, "Connecting to DC Power," for DC power connection instructions.

Starting the Terminal-Emulation Software

Before you power on the switch, start the terminal emulation session so that you can see the output display from the power-on self-test (POST).

The terminal-emulation software—frequently a PC application such as Hyperterminal or ProcommPlus—makes communication between the switch and your PC or terminal possible.

Follow these steps to start a terminal-emulation session:

Step 1 Start the terminal-emulation program if you are using a PC or terminal.

Step 2 Configure the baud rate and character format of the PC or terminal to match these console port default characteristics:

- 9600 baud
- 8 data bits
- 1 stop bit
- No parity
- None (flow control)

Connecting to a Power Source

Follow these steps to connect to an AC power source:

Step 1 Connect one end of the supplied AC power cord to the power connector on a switch rear panel. See Figure D-2.

Step 2 Connect the other end of the power cable to a grounded AC outlet.

Follow these steps to connect to an DC power source. For detailed instructions for connecting to DC power, see Appendix C, "Connecting to DC Power."

Step 1 Connect one end of the supplied DC power cord to the power connector on a switch rear panel. See Figure D-2.

Step 2 Connect the other end of the power cable to a grounded DC outlet.

When the switch powers on, it automatically begins the power-on self test (POST), a series of tests that verifies that the switch functions properly. When the switch begins POST, the system LED slowly blinks green. When POST completes, the system LED blinks amber. If POST fails, the system LED remains amber. If POST completes successfully, the system LED rapidly blinks green.

Note POST failures are usually fatal. Call Cisco Systems if your switch does not pass POST.

If you started the terminal emulation program before you powered on your switch, the PC or terminal displays the bootloader sequence. You need to press **Enter** to display the setup program prompt.

Entering the Initial Configuration Information

To set up the switch, you need to complete the setup program, which runs automatically after the switch is powered up. You must assign an IP address and other configuration information necessary for the switch to communicate with the local routers and the Internet.

IP Settings

You will need this information from your network administrator before you complete the setup program:

- Switch IP address
- Subnet mask (IP netmask)
- Default gateway (router)
- Enable secret password
- Enable password
- Telnet password

Completing the Setup Program

Follow these steps to complete the setup program and to create an initial configuration for the switch:

Step 1 Enter **Yes** at these two prompts.

```
Would you like to enter the initial configuration dialog? [yes/no]: yes

At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.

Basic management setup configures only enough connectivity
for management of the system, extended setup will ask you
to configure each interface on the system.

Would you like to enter basic management setup? [yes/no]: yes
```

Step 2 Enter a host name for the switch, and press **Return**.

On a command switch, the host name is limited to 28 characters; on a member switch to 31 characters. Do not use *-n*, where n is a number, as the last character in a host name for any switch.

```
Enter host name [Switch]: host_name
```

Step 3 Enter an enable secret password, and press **Return**.

The password can be from 1 to 25 alphanumeric characters, can start with a number, is case sensitive, allows spaces, but ignores leading spaces. The secret password is encrypted and the enable password is in plain text.

```
Enter enable secret: secret_password
```

Step 4 Enter an enable password, and press **Return**.

```
Enter enable password: enable_password
```

Step 5 Enter a virtual terminal (Telnet) password, and press **Return**.

The password can be from 1 to 25 alphanumeric characters, is case sensitive, allows spaces, but ignores leading spaces.

```
Enter virtual terminal password: terminal-password
```

Step 6 (Optional) Configure Simple Network Management Protocol (SNMP) by responding to the prompts. You can also configure SNMP later through the CLI. To configure SNMP later, enter **no**.

```
Configure SNMP Network Management? [no]: no
```

Step 7 Enter the interface name (physical interface or VLAN name) of the interface that connects to the management network, and press **Return**. For this release, always use vlan1 as that interface.

```
Enter interface name used to connect to the
management network from the above interface summary: vlan1
```

Step 8 Configure the interface by entering the switch IP address and subnet mask and pressing **Return**. The IP address and subnet masks shown below are examples.

```
Configuring interface vlan1:
Configure IP on this interface? [yes]: yes
IP address for this interface: 10.4.120.106
Subnet mask for this interface [255.0.0.0]: 255.0.0.0
```

Step 9 Enter **Y** to configure the switch as the cluster command switch. Enter **N** to configure it as a member switch or as a standalone switch.

If you enter **N**, you can configure the switch as a command switch later through the CLI. To configure it later, enter **no**.

```
Would you like to enable as a cluster command switch? [yes/no]: no
```

You have now completed the initial configuration of the switch, and the switch displays its initial configuration. This is an example of output that appears:

```
The following configuration command script was created:
hostname switch1
enable secret 5 $1$Ulq8$DlA/OiaEbl90WcBPd9cOn1
enable password enable_password
line vty 0 15
password terminal-password
no snmp-server
!
no ip routing

!
interface Vlan1
no shutdown
ip address 10.4.120.106 255.0.0.0
!
interface FastEthernet1/0/1
!
interface FastEthernet1/0/2

interface FastEthernet1/0/3
!
...<output abbreviated>
end
```

Step 10 These choices appear:

```
[0] Go to the IOS command prompt without saving this config.

[1] Return back to the setup without saving this config.

[2] Save this configuration to nvram and exit.
```

If you want to save the configuration and use it the next time the switch reboots, save it in NVRAM by selecting option 2.

```
Enter your selection [2]:2
```

Make your selection, and press **Return**.

After you complete the setup program, the switch can run the default configuration that you created. If you want to change this configuration or want to perform other management tasks, use the CLI.

To use the CLI, enter commands at the *Switch*> prompt through the console port by using a terminal program or through the network by using Telnet. For configuration information, see the switch software configuration guide or the switch command reference.

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